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Nahua Perspectives on Natural Resources, Labor, and Social Well-Being

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This dissertation analyses how indigenous communities from the Tlaxcala and Chalco regions of central Mexico responded to the exploitation of their knowledge, natural resources, and labor in the sixteenth century. In proposing social models that focused on natural resources and specialized labor, the Nahua directly influenced colonial economic policy and promoted a more ecologically sustainable model of colonization.

In developing strategies for incorporating the indigenous populations into the colonial society of New Spain, the Spanish monarchy relied on agriculture, mechanical arts, and commerce. This reliance led to the exploitation of resources, the adaptation of local industries and transatlantic commerce, as well as the displacement and depopulation of local inhabitants. As Spaniards and indigenous participants engaged with each other and the natural environment, they brought about dramatic changes to pre-Hispanic and Spanish sociopolitical frameworks. The Nahua influenced colonial agriculture and crafts, and the formulation of policies with concrete effects on the common welfare of their communities. My dissertation analyzes the way that local populations, in responding to the exploitation of natural and human resources, were influenced by Nahua traditions around natural products. I explain how the Tlaxcalan and the Chalca made Nahua concerns a part of the colonial agenda. Both Nahua and Spanish writers used discussions of natural commodities as points of engagement between European and indigenous participants. I recognize the cochineal dyestuff and timber industries as conduits for natural and social exploitation, but also as sites where indigenous agency safeguarded natural products, laborers, and patrimonial territories.

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Abreviations

AGN Archivo General de la Nación, Mexico City

Introduction. Reciprocal Engagement: Natural Products, Spanish Colonial Authorities, and Local Populations

> "'*Instruction from his Majesty King Charles [V]. . .*' That between said Indians and Spaniards there be contracts and voluntary commerce to the benefit of both parties, trading the things they each possess with one another, but you [the Spaniard] must guard, or suffer the consequences, that nobody on account of such agreements, take anything from the Indians against their will, nor through trickery, but rather through clear and free undertakings. . . because aside from those benefits mentioned, this will be reason for them to love us. (Encinas 249)[1]

The Spanish monarchy employed agriculture, mechanical arts, and commerce as instruments to incorporate indigenous populations of central Mexico into the colonial society of New Spain.[2] In this way, Spaniards and indigenous populations engaged with each other and with transplanted and native natural products adapting Spanish and local agriculture, "expressions of industry", and commerce (Miño Grijalva 800).[3] Still, the Spanish crown did not

[1]I have done my best to translate quotations into English from all sources in Spanish throughout the dissertation.

[2] Pamela Long defines these as "arts and crafts carried out by skilled artisans."(10) Often they are dependent on a specific technique that might or might not be general knowledge.

[3] Manuel Miño Grijalva uses the term "expressions of industry" to describe the various manifestations of mass production of colonial products that do not fit the mold of a "proto-industry" or previous to the European industrial revolution (793). He questions whether the term "proto-industry" should apply to the Mexican colonial model. Miño Grijalva challenges Franklin Mendel's term, generally defined as a "first phase" of industrial development (794). Mendel attributed the following characteristics to a proto-industry: the family as a basic unit of production, the need for intermediaries between production agents and the marketplace, and a

generate the idyllic transition into political subjection Charles V had expressed, resulting in the exploitation of resources, modification of industries, appreciation and depreciation of product values, and the displacement or depopulation of local communities. Simultaneously, how Spaniards and Native Americans engaged with their natural environment, and particularly Nahua efforts to strive for political reciprocity, prompted the creation of new frameworks and policies that restructured traditional societies for the benefit of local populations.

Hernán Cortés (1485-1547), commander of the military victory over Tenochtitlan, present day Mexico City, sent news about prevalent natural resources and intricate craftwork found in the Mexica capital city, and by doing so initiated a shift in which the Spanish crown began to reconceptualize indigenous populations from savage to rational beings, able to live under political law (Bustamante, "El conocimiento" 35).[4] Cortés's observations prompted the monarchy to enact a mandate that defined the parameters of engagement between the metropolis

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product that was not destined for local consumption. Though there is some overlap between these aspects of production and certain colonial industries, Miño Grijalva has questioned if Mendels's criteria can apply to the complex structures of guilds and textile production systems requiring a division of labor, highly specialized workers, critical manufactured capital, and high demand outside of the production zones and into a global market (803). Miño Grijalva also pointed out that mass production of goods in Mexico called for strict quality control (804). Though the systems that facilitated the mass production of natural products and in particular cochineal dyestuff and timber might not be categorized as "industries", in the modern sense, however, they surpass proto-industries. In addition to possessing some of the complexities mentioned above, the cultivation of cochineal and the production of lumber were autochthonous practices to the Tlaxcalan and the Chalca populations respectively and as we shall see the symbiotic relationship between the monarchy and the Nahua groups that centered on natural resources sometimes blurred the lines of who held ultimate control of specialized knowledge and the product. For simplicity these Nahua "expressions of industry," will from this point forward be given the designation of "industries."

[4] Peter Martyr D'Anghera (1457-1526), Royal Chronicler and ambassador disseminated news about the New World. Though he never set foot on the American continent, he was directly connected to those informants who spoke of their travels, including Cortés. In Martyr's *De orbo novo* (1530), he pondered whether, "The future will show what more we have to do. To say the truth, we hardly know what decision to make. Should the Indians be declared free, and we without any right to exact labour of them, without their work being paid? Competent men are divided on this point and we hesitate" (272).

and its colony. The "*Instrucción que su Magestad el Rey don Carlos y Doña Juana su madre dieron a don Hernando Cortés para el buen tratamiento y conservación de los Indios, y su población y pacificación y buen recaudo de la real hacienda*"(1523) stated:

> …according to your accounts and those of other people who have returned, the Indians that are native and reside there are more skilled and able and reasonable than the other Indians…on account of those experiences . . . There is in them more readiness to know our Lord and to become instructed and live in His wholly Catholic faith as Christians. . .For those reasons stated, it seems as though the Indians have good aptitude and reason to live in a political and orderly state in the townships that they have. (Encinas, qtd. in Bustamante, "El conocimiento" 248)

Royal authorities no longer considered local populations underdeveloped and expendable. Indigenous communities were deemed capable to live autonomously, albeit within the constraints of Spanish rule.

Along with maintaining Nahua sociopolitical units or *altepetl*, royal authorities continued to employ the Nahua tributary system in which local populations paid a portion of the goods they produced and/or offered themselves as labor (Encinas 248). Such taxes were comprised of natural products, mineral, animal, or plant, and manufactured goods, dyes, woven textiles, or sculpted metals, and physical labor that the Crown desired. Spanish authorities and local populations therefore relied on local craftsmanship and cultivation practices to accomplish the social transition of the new vassals into a Spanish colonial mold.

The *Instrucción* also included that there be commerce established between Spaniards and indigenous populations. As mentioned above, "to the benefit of both parties, trading the things they each possess with one another, but you [the Spaniard] must protect or suffer the

consequences, that nobody on account of such agreements, take anything from the Indians against their will, nor through trickery, but rather through clean and free undertakings" (Encinas 249). The Crown connected commerce to an act of political communication able to carry out the moral oversight of the new vassals and procure wealth for the monarchy. King Charles V sought a commercial relationship, and thereby suggested there be an underlying righteous and reciprocating agreement between his monarchy and the Nahua populations of central Mexico. Throughout the colonization of the New Spain, Spaniards and local populations would strive to balance their degree of interdependence with each other and with their natural environments, oscillating between reciprocity and interdependence and subjection or annihilation. As we shall see, the Nahua who held control of natural resources or commodities and skilled labor resisted exploitation by fostering the Crown's dependency on their products.

Spanish Colonization and Natural Products

Throughout the Spanish colonization of the Americas from the late fifteenth-century to the early nineteenth-century, royal authorities used natural products to promote economic gain for the monarchy. This project further asserts that in a simultaneous process, the Spanish monarchy and local populations used natural resources as the means to reconfigure Nahua traditional sociopolitical organization and to incorporate local populations into a state of colonization. Colonial authorities, the monarchy, and transatlantic commerce grew dependent on certain products and gave way to the exploitation of autochthonous knowledge, natural resources, and skilled labor force. Still, indigenous participants responded by generating preservation strategies that advocated for the conservation and regeneration of both natural resources and local communities. The Nahua of central Mexico exercised autonomous control of their

lucrative products and their respective specialized knowledge to dictate a degree of agency and influence over the unfolding social hierarchy.

My dissertation considers how Spaniards and indigenous populations engaged with their natural environment during the sixteenth and early seventeenth centuries. Spanish and Nahua informants discussing local and transplanted plants or animal products approached natural resources as "creative and shaping forces" (R. Williams 221). They discussed the practical uses of natural resources and commodities and in doing so conveyed sociopolitical effects that the transference, cultivation, and production of natural products bore on the developing colonial society. The Nahua fought to manage their industries, regulate the production of natural resources, improve the safety of workers, and maintain proprietorship of their patrimonial territories. Authors who recorded information about natural products often introduced indigenous agents who innovated autochthonous uses of natural products in order to liberate themselves from current unsustainable circumstances. As we shall see, through the strategic use of natural products, local populations resisted political subjection and influenced their standing in colonial society.

The late fifteenth through the eighteenth century marked a period in which information about natural resources in the Americas circulated incessantly. Both Spaniards and indigenous informants communicated practical information about plants, animals, and minerals relaying the benefits that both local and transplanted products could have in medicine, textiles, and many other areas. Information circulated locally and across the Atlantic Ocean in the form of letters, responses to surveys, published texts, legislation, transcriptions of oral testimonies, or illustrations.

Aside from recording practical information about natural products Spanish and Nahua authors often included their respective assessment of sociopolitical circumstances. Both Spaniard and indigenous populations contributed to the dissemination of such information to determine a resource's transferability into colonial societies. In this way, discussions about natural products also provided another instrument for informants to register a response to the current colonial experience. In many cases to speak of local and transplanted natural products during the colonization period transcended the practical descriptions of nature and simulated philosophical exercises.

Most authors relied on indigenous knowledge to describe particular plants, insects, or animals, its respective habitat, its method of cultivation and manufacture, as well as discerning whether its uses and applications were relevant to the needs of Spanish settlers or transatlantic commerce. Natural products and related indigenous labor became more than triggers for the exploitation of nature, eradication of knowledge, and depopulation. The manner in which Spaniards and indigenous populations engaged with each product salvaged autochthonous industries, and as importantly, the respective sociopolitical frameworks that regulated specific resources or commodities and specialized labor.

Through the colonization of the Americas, Spaniards did not simply assimilate indigenous traditions into European systems. Local populations actively adapted as well as incorporated their traditional uses of plants, animals or minerals to guarantee their own interests. How the Nahua interacted with natural products became indissoluble to Spanish economic, social, and political considerations. In the case of the Tlaxcala and Chalco regions of central Mexico, Nahua participants through their environmental and "technological choices" (Candiani 7) devised more sustainable colonization models aimed at conserving their products or resources,

specialized labor, and territorial patrimony.[5] By analyzing indigenous involvement in the cochineal dye and timber production in Mexico, I explain how said indigenous agents used their relationship to natural products to influence their degree of autonomy under Spanish governance.

Recent scholarship centered on the industrial expansion of transplanted and native natural products in the Americas during the colonial period has acknowledged the role of commodities and indigenous informants in an enterprise that benefited the monarchy or Spanish entrepreneurs (Bustamante, Bleichmar, Barrera-Osorio, Cañizares-Esguerra, De Vos, Schiebinger). Most recent studies portray the manner in which Spanish and indigenous participants engaged with nature as yet another example of European interest in and exploitation of resources and indigenous laborers. Some historians have reduced the colonization of the Americas to a process in which Spaniards eradicated or assimilated Nahua traditions into European frameworks (Coatsworth). This approach denies local populations their role as agents and portrays them as inactive subjects in the development of natural industries and the configuration of colonial society.

In a similar manner, environmental historians have denied indigenous participants their role as agents in both the devastation as well as the conservation of plant and animal resources. To speak of an "ecological imperialism" in which "Iberians rebuilt. . . and Europeans disassembled the existing ecosystems" (Crosby 279) severely overshadows contributions and resistance by indigenous populations.[6] The onset of conservationist strategies is attributed to the

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[5] Vera Candiani has stated, "What links action, material realities, and social context together are people's technological choices" (7). Though she is specifically speaking about the process leading to the *desagüe* or draining of all of the lakes in the Valley of Mexico, and when speaking of this process does not detail the colossal devastation the Chalca populations suffered nor the resistance they launched aginst deforestation and depopulation, Candiani has understood the colonizing process to be replete with local active participants who influenced the project as did the colonial viceregal authorities who ordered it.

[6] Michael Williams condenses "ecological imperialism" to any changes in ecology of a territory as a result of take over or penetration of the group by another" (169).

era of the East India Company during the mid-seventeenth century (Grove 6). There are scholars, however, who have attempted to do away with misconceptions that forests were untouched prior to European colonization of the Americas (Peters, Candiani).[7] As we shall see in Chapter two, the Nahua influenced the development and administration of forests prior to the arrival of the Spanish and similarly they even possessed laws to conserve their timber resources.

I engage in dialogue with recent historical scholarship that has explained how indigenous communities preserved their political autonomy despite colonial rule (Reyes García, A. Martínez, Lockhart, Burkhart, Offner). Social historians have established that even under Spanish rule, Nahuas contributed to agricultural, industrial, and commercial endeavors (Sempat Assadourain, Gonzáles Jácome, Alzate, Monteiro). I elaborate on these discussions and provide case studies to explain the degree to which local contributions to cultivation and technical practices were deliberate, affected social policy, and advocated for indigenous interests.

As mentioned above, recent research has sought to understand the effect that Spanish empire had on the reconstitution of indigenous societies, and less so on how the Native American population actively shifted policies to ensure their common welfare.[8] Anglophone research especially has granted little attention to how respective Nahua populations experienced

[7] Charles Peters has proved that silviculture or "the art of producing and tending a forest" already occurred prior to the arrival of Christopher Columbus (1451-1506) (204).

[8] Kapil Raj has accurately stated that, "Scientific propositions are not forced upon others rather they disseminate only through complex processed of accommodation, negotiation, as contingent as those involved in the production. . . 'There is no algorithmic recipe to successful replication'" (9). Though Raj focuses on the construction of scientific knowledge in South Asia, he also has sought to establish that the transference of knowledge and skills was an "active process of reception and reconfiguration" (10).

colonization, depending on their specific relationship with the Spanish Crown as well as their unique geography, natural products, and skilled manufacturing capacity.[9]

I turned to Mexican contemporary and colonial regional historians as well as original archived legal documents of the sixteenth and seventeenth centuries to determine how indigenous communities contributed to the formulation of colonial societies. My project focuses on the cochineal dyestuff industry in Tlaxcala and timber production in Chalco. The availability of archival documents and legislation as well as the frequency in which informants discussed these industries helped define my focus. As I began my analysis, I repeatedly found instances of resistance by Tlaxcala and Chalco often connected to the administration and conservation of the natural resources they governed. These two Nahua populations had formed respective alliances with the Spanish Crown in their military conflict with the Mexica of Tenochtitlan, and the Tlaxcalan and the Chalca gained important political concessions from the monarchy, such as the ability to maintain their territories and manage their natural resources and labor forces.

Figure 1. Map of the Valley of Mexico, 1550s(?), Amecameca, Chalco and Tlaxcala, as well as the prominent "Ixtaccihuatl" [sic.] and Popocatepetl mountain ranges, in Charles Gibson, *Aztecs Under Spanish Rule*, Inside Cover.

[9] Daniel Mato has coined the term "globalization processes" in order to identify the specific agents and their the interrelationships and interdependencies that give way to globalization (147). It is imperative that we take a similar approach to reach a better understanding of colonization, to prevent from "making invisible the practices of agents" (148).

I also analyze colonial Spanish and Nahua natural and regional histories along side the corresponding laws, licenses, or decrees governing particular natural products to identify the specific actions that local populations carried out to influence colonial authorities in their favor. The Nahua and their relationship with natural resources helped determine how they understood Spanish rule, resulting in concrete strategies to achieve their welfare.

While some scholars have identified the critical role of indigenous populations in the formulation of industries related to natural products, primary sources also communicate that the Crown, albeit the imperial power, depended entirely on local knowledge, native resources, and indigenous labor (Muñoz Camargo, Chimalpahin, F. Oviedo, Zumárraga, Arias de Benavides, Monardes). Primary sources explained how industrial communities that possessed natural resources and a manufacturing skillset that benefited the Crown attained significant political leverage that protected local interests. In turn Nahua participants possessed and exercised a degree of agency necessary to escape, resist, and acquire a semblance of autonomy under Spanish rule.

Analyzing a Colonial Enterprise Through the Practical Engagement with Natural Products

Authors recorded practical and philosophical discussions about natural resources and the economic and sociopolitical ramifications of colonial engagement with natural products. In the case of Spanish authors, they observed and recorded how local populations used natural resources as a means to resist and escape Spanish subjugation. Through prominent figures such as Bishop Juan de Zumárraga (1468-1548), the Archbishop of Mexico City; Fr. Toribio de Benavente Motolinia (1482-1568), a Franciscan missionary and Nahua ethnographer; Gonzalo Fernández de Oviedo y Valdés (1478-1557), a Royal Chronicler; and Andrés Laguna (1499-

1559), the royal court physician as well as other informants we become aware that indigenous populations recognized that when talking about the products of their land, Spaniards also discussed human behavior, particularly labor and the ways labor helped to shape communities.

In a letter to Pope Paulo III written in 1535, Fr. Julián Garcés (1452-1542), Franciscan and first bishop of the region of Tlaxcala in the New Spain, asked, "Who is of such shameless spirit and so obtuse that dares to affirm that those who we witness as infinitely skilled in the mechanical arts are incapable of receiving the Faith, and that under our ministry, it is certain that they are of good nature, faithful, and diligent" (Acuña, *Fray* 26).[10] Garcés echoed the 1523 mandate that deemed local communities capable of living *en policía* because of a demonstrated ability to procure goods and elaborate crafts. Nevertheless, Garcés's assertion connected the dexterity of indigenous populations in mechanical arts to their capacity to be Christianized. He also specified how missionaries needed to assure the success of this process. Franciscan friars became their primary intermediaries, supervising the evangelization and also the development of local populations as a skilled labor force. This process also allowed Spanish authorities to understand and configure the social organization of local communities to Christian mechanisms.

The silk industry provides an example of how the transplantation of foreign commercial products and their respective craftsmanship onto American soil had social, political, and economic effects on the society of the New Spain. Indigenous participants quickly understood how they could alter their own experience, influencing colonial policies to control production of natural resources or respective manufactures. As early as the 1530's, Colonial society recognized indigenous craftsmen as skilled breeders of silk, able to rival Spanish craftsmen, and impact prices as well as transatlantic commerce. The process of transplantation affected and served the

[10] See Roberto Heredia Correa in Acuña for details about the inconsistencies that challenge a 1537 date for this document (Garcés 42f.).

colonial enterprise, Spanish settlers and local populations. As we shall see with cochineal dyestuff and timber, the cultivation and production of silk by the Nahua linked nature, labor, and sociopolitical harmony as a strategy to achieve common welfare under Spanish rule.

Indigenous people of the New Spain did not participate in the transplantation of alien plants and animals and their respective cultivation, production, and craftsmanship to duplicate European society at the expense of indigenous resources or manufacturing practices. Similarly, Spanish authorities relied on natural resources and their related labor to shape social organization, however, doing so did not result in a unidirectional process of passive ideological subjugation of the Nahua people. Instead, the manner in which native peoples engaged with local and transplanted products after Spanish arrival demonstrates their role as agents challenging, modifying, and appropriating European ideology, technical practices, as well as legislation in order to redirect the colonial enterprise in favor of indigenous concerns. Both Spanish and Nahua participants gave way to a complex process that prompted both the imposition of alien plants, animals, and technologies as well as simultaneously encouraged the adaptation and innovation of technologies, specialized workforce, and policies.

In official correspondence to king Charles V in the 1530's, Archbishop Fray Juan de Zumárraga formally reported the success indigenous populations had experienced through the transplantation of Castilian natural products in the New Spain. In his letter, he required the instruction of Nahua people specifically in the art of silk cultivation. Zumárraga presented sericulture, or breeding silk, as a means for economic profit and a requisite for the social sustainability of both indigenous and Spanish participants. For Zumárraga, the transatlantic expansion of European natural products provided a remedy for the prevalent nostalgia experienced by Spanish settlers and the key to transition indigenous people seamlessly into a

colonial state and evangelization. Zumárraga deemed natural resources as well as their cultivation and manufacturing techniques essential to a sociopolitical reconstitution of the New Spain that would incorporate local populations into economic contributors and live in *policía*, but also attract settlers from Spain.[11]

The transplantation of natural products or duplication of Spanish agricultural or mechanical practices did not render indigenous people impotent nor eradicate local culture. Zumárraga stated the degree to which Nahua resisted political subjection, using their role as primary cultivators and manufacturers of Castilian products and pressuring colonial authorities to comply with their demands.

Throughout the sixteenth-century, indigenous populations understood their impact on global market economies and the legislative leverage they possessed over matters of agriculture and profitable industries for the Spanish empire. In the 1530's while Spanish royal and ecclesiastic authorities debated whether to demand a tithe of the indigenous community for the products they cultivated, Zumárraga objected out of concern that local peoples would interpret it an uncharitable act and contradictory to the teachings of the Church (García 133). Zumárraga protested to royal authorities that as a result, local people involved in the cultivation of transplanted products had simply opted to abandon those industries. By the 1550s, indigenous silk breeders continued to protest tithing goods of imported industries such as cattle, wheat, and

[11] To Zumárraga, living *en policía* meant: "It can be inferred that if these natives so capable of reason, manner of living *en policía* and in trades as in Castile, joining towns with streets and plazas [] in the same way as the towns of Castile, that in turn it would be enough reason to instill Christianity within them, they would be rich in little time, and they will not diminish or die like beasts in the fields and foothills, by being so far away from each other that they cannot make use of each other in their need or illness. . . and this is the principle by which the land will become more populated and the land will be preserved, and in order for our blessed king to receive much service and all of Castile extreme benefit (García, app. 115). For an analysis of how colonial historians used this term see Juan Lechner.

silk. In response to the failed royal decree of 1543 allowing the taxing of Castilian products, the king revised his decree in 1555:

> . . . The Indians become aggravated because in a number of towns they have constructed monasteries and churches, out of their own expense, and they support the missionaries and they provide the churches with crosses, chalices, ornaments, and everything else that is necessary, and they consider it bad practice to tithe, on top of the tribute they [already] pay, and they have made public that if wheat, cattle, and silk that they will not cultivate it, or raise the cattle, or breed the silk. (Puga, II 256)

Guided by Zumárragas mediation, pressured by indigenous demands, the king rescinded the mandate (García 133-34).

During the 1540s sericulture in Mexico had been successful, reared in very good quality and in less time than in Spain (Motolinía 192).[12] By 1550, ordinances regulated labor conditions of indigenous breeders. For example, licenses stated that "one could not occupy the natives of the town nor force them to rear silk; if they are willing, and in no other manner they would be willing to assist in its rearing…they must be paid for their labor" (Zavala, *Libros* 120). On January 21, 1552 the viceroy granted another license to the people of Cocola, located in the Mixteca region that stated:

> …so with the mulberry trees that they have on their lands and jurisdiction, they can bring any silk that they wanted and that by fortune they possessed and he mandates that no authorities or other person impede them from [doing so], and freely, as free vassals of His Majesty, they are allowed to rear it in order to pay

[12] In the case of silk, Agustín Dávila Padilla (1562-1604) recorded decades later that the labor performed by indigenous silk producers generated the "best silk in the world" (172).

> with their earnings their tribute and provide other necessary things to benefit the republic (Zavala, *Libros* 115-116).

Similar incentives encouraged the propagation through human industry of certain natural resources and also distributed wealth among local participants.[13] As we shall see in the next chapters despite regulations, industrial monopolies led to conditions of resource and human exploitation. As the monarchy became dependent on the cultivation and manufacturing knowledge of certain indigenous populations, local populations such as the Tlaxcalan and the Chalca were able to employ political influence to serve their interests.

Fr. Toribio de Benavente or "Motolinía" was one of the twelve Franciscan missionaries to set foot in the New Spain to carry out the "methodic evangelization" of the New Spain (Ricard 21). In his *Historia de los indios de la Nueva España* he recorded significant aspects of Nahua culture and history as well as the manner in which Spaniards and the Nahua interacted during the first decades of the colonization process. In particular, Motolinía addressed how indigenous populations engaged with transplanted plants and animals and related mechanical arts.

Motolinía described how the Nahua had incorporated products to their evangelization experience, how they had appropriated and perfected respective mechanical arts, as well as how they had used natural industries to influence colonial society and economy. He discussed that certain plants such as *yerbabuena*, or mint, and *clavelina* flowers had "multiplied in this land in an incredible manner" (69). Indigenous populations used these natural products and recently

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[13] In the region of Tlaxcala, this translated into the emancipation of *macehuales* from their respective jurisdictions as the *macehuales* obtained economic freedom and left their lands (A. Martínez, *Gobierno* 181). Consequently, the Tlaxcalan governing bodies or *Casas señoriales* lost their work force, an act that resulted in plots of uncultivated land prone to appropriation by Spanish entrepreneurs. This development had considerable political ramifications as without its labor force and land, the Tlaxcalan Indian government weakened and became vulnerable to increasing interference from viceroyal forces (A. Martínez, *Gobierno* 181-182).

acquired technical skills to elaborate true-to-life, artistic displays representing forests, animals, and deities for processions. Motolinía praised how the Nahua employed natural products and he gaged their evangelization by the level of their skill and content of their crafts. Motolinía also recorded how local populations engaged with other transplanted commodities and how their respective mechanical crafts impacted the administration and economic markets of colonial society.

Referring to the commerce of flowers, Motolinía mentioned that the "The Indians availed themselves of two thousand loads of roses; and about one fifth of them were *clavelinas* that came from Castile, and have multiplied in such a way that it is an incredible feat. The bushes are more impressive than in Spain and they flower year round" (80). Motolinía recognized the ease at which transplanted species propagated in the New Spain, and also registered how the Nahua were partial to the Castilian flowers. He described that in order to have them year-round, they would plant gardens "and in not having them…they send for them ten to twelve leagues to the towns in tropical climate [*tierra caliente*] that always have them and are of a wonderful fragrance" (69). The Nahua had incorporated transplanted goods into local commercial circuits as well as autochthonous social practices.

Motolinía also observed the benefits and tensions that emerged form the Nahua's ability to manufacture their local products and imitate or *contrahacer* Spanish mechanical crafts. The missionary particularly valued Nahua traditional feather craftsmanship and mentioned that if masters in Spain and Italy witnessed the technical craft, they would contemplate it "open-mouthed" (68). Motolinía described that Nahua skill carried over to European trades; their skill was such that Spanish craftsmen deliberately hid their techniques from them.

Explaining how the Nahua had learned to blend, or *batir* gold, Motolinía recorded that they would "watch the intricacies of their craft, count the number of times the hammer would strike, and how [the master] would turn and stir the mold, and before a year was done, they were able to blend the gold" (212). He also shared an anecdote in which a Nahua craftsman, in order to improve his skill, stole and then returned a saddletree or *fuste* only to come back days later to sell the perfected product to the same Spaniard from whom he stole (213). Motolinía recorded the frustration of the Spanish saddle-maker: "once the Indians know a trade, the Spaniards then lower the prices because there is only one official among them, [the Indians] sell as they wish, and for this reason the skill and ingenuity of the Indians has been devastating" (213). In this case, Motolinía presented Nahua technical skills as a detriment to Spanish product competition yet he continued to praise the talent of the indigenous artists.

> [The Nahua] take the inventions that they know how to do, and that which they have taken and learned from our Spaniards; and each year they take great pains to make it even better, and they continue watching like monkeys to imitate everything that they see is being made, that even in crafts, just by watching and without practicing, they become masters (82).

Though Motolinía spoke of Nahua "stealing" knowledge and associated their appropriation of Spanish crafts with the mimicking of animals, he praised the unrivaled craftsmanship and ability by which the Nahua had integrated transplanted products and respective manufactures into their every-day experience and their process of evangelization (85, 212).

Despite the detriment to transatlantic commerce, Motolinía also expressed that the land in the New Spain would be even more valuable if it were cultivated with products that would

propagate well (189). While Motolinía did not specify who or how production ought to be carried out, he did acknowledge the role that indigenous peoples occupied in colonial society of the New Spain. Angered by how missionaries at the Tlaxcalan monastery had refused baptism to many Nahua because the priests were unwilling to impart their teachings to such "bestial peoples" (115), Motolinía retorted:

> It is my impression that one cannot employ their education in a better way than to show the way to those who do not know the path to salvation and to know God. How much more obliged to these Indians would they be if they indulged them like silk worms, since it is by their sweat and labor that those that by chance come from Spain without capes dress and enrich themselves. (115)

Motolinía advocated for the reconceptualization of the Nahua not as "barbarous" but as individuals capable of evangelization and of becoming masters of skilled arts. It is also curious that Motolinía used the silk worm to reprimand the clergymen for their obstinacy to nurture the Tlaxcalan in their evangelization calling out the diligence they offered in the care of the natural products. As the first chapter will explain, the Tlaxcalan would soon be asked to facilitate the acculturation and evangelization of Chichimec nomadic populations through the employment of mechanical arts and in particular the cultivation of the cochineal insect. As the image of rearing silk worms conveyed, the cochineal insect would also symbolize the ability of the Tlaxcalan peoples to pacify and incorporate nomadic populations into New Spain's colonial society.

By the 1560's mechanical arts and agriculture became requirements to carry out the "good organization"(Encinas 248) of local societies. Franciscan missionary Alonso de Molina (1514-1585) in his *Confesionario mayor* (1565) provided a spiritual guide written in Nahuatl and

Spanish that addressed the penitent and his confessor in order to facilitate and encourage the act of confession and therefore the salvation of the soul (f.4v, f.7r, f.8v). Molina's *Confesionario* served a dual function. While it charged itself with he expurgation of sin, implicitly, it also applied ecclesiastic law to quotidian activities related to the mechanical arts.

In his explanation of sins related to the Seventh Commandment, Molina identified the capacity of the indigenous populations to corrupt their souls in the practice of mechanical arts and agriculture. He focused on the cacao and liquidambar cultivation, dyeing, metalwork composition and sculpting, basket weaving, as well as the act of selling and the oversight of workers, and condemned any deliberate corruption of materials, lazy or poor craftsmanship, and theft (Molina, *Confesionario* f.38r-f.45r). Through his detailed knowledge of immoral acts committed in these skilled crafts, Molina did not allow the penitent any room to deviate from the sacred path.

The detailed list of the possible sins in each profession put into question whether Molina sought to save the souls of local craftsmen or if the *Confesionario* acted as a complement to political legislation to teach and preach against sinful acts related to New Spain craft production and agriculture of the sixteenth-century. There was no space in Molina's concept of the arts for immoral behavior, and this *Confesionario* perfected the arts and contributed to the social well being of the New Spain by eradicating deviant behavior.

Whether it was through innovative uses of local products as Oviedo portrayed or as Motolinía and Zumárraga conveyed a Nahua ability to copy or "steal", *hurtar* technical skills "without learning"(García, app. 114) or "watching like monkeys" (Motolinía 82), both Spanish and indigenous informants became aware of how the application of indigenous skill could have

an effect beyond their local sphere.[14] The commercialization of Castilian commodities in New Spain and particularly silk helps explain that indigenous populations did not simply imitate foreign crafts, but were aware of how their participation could successfully shift colonial policies to their advantage. Local participants acted as agents. Even while practicing the agriculture, industry, and commerce of Spanish products, they exercised a degree of autonomy as they modified the original trades and cultivation practices. After all, "mimetic practice carries out its honest labor by suturing nature to artifice, granting the copy the character and power of the original, the representation the power of the represented" (Taussig xviii). The Nahua appropriated transplanted natural goods and adapted their own crafts and products to their current economic, social, and political realities thereby contributing to the shaping of the gestating colonial society of the New Spain.

Shaping a Colonial Enterprise Through a Philosophical Engagement with Natural Products

Gonzalo Fernández de Oviedo y Valdez wrote down his observations and experience in the West Indies. In his *De la natural historia de las Indias* (1526), and a second work *Historia general y natural de las Indias* (1535, 1552), Oviedo presented different accounts of various newfound products he sought to describe under his charge of royal chronicler. He was among the first to witness and publish information about autochthonous plant, animal, and mineral resources of transatlantic territories. Oviedo communicated practical information about the products. Recording what he saw or what was credibly mentioned to him, he also conveyed how

[14] Motolinía also recognizes this same awareness in their trading of cacao: "where the crop is cultivated and harvested the load is worth five or six pieces of gold, taking [the load] inland the price rises, and it also rises and falls depending on the time of year, because in a good year, it multiplies" (190).

Spaniards and local populations engaged with their natural environments and each other. He described his methodology in following manner:

> I do not write with the authority of a historian nor a poet, but rather as an eye witness…and that which I did not see I will mention through testimonies of trustworthy individuals never giving any one thing credit to one witness, but to many for those things I did not experience myself. And I will say them in the way I understood them and by whom; because I have documents and orders from his Caesarean Majesty that all governors and authorities of the Indies inform me and give me true testimony of everything that is worthy of history, through authentic testimonies, singed by their name and designated public scribe in such a way that they may be certifiable. (*Historia* 10; pt. 1, bk. 2, ch. 1)

Oviedo employed judicious guidelines of selection as well as followed a regimented process to authenticate the information he volunteered. While he included how Spaniards began appropriating and experimenting with local natural resources, his accounts also conveyed how settlers and local peoples were responding to the autochthonous or altered use of local products. Oviedo also portrayed natural resources and local labor as intricately linked elements. Of particular interest are discussions in which Oviedo used his descriptions of certain natural products to introduce the current conditions of indigenous labor.[15] Oviedo selected anecdotes in which Native Americans turned to nature to free themselves from exploitation. He shared that local populations of the West Indies used plants and their derivatives to escape situations of bondage. Though Oviedo served as an emissary of the court, such narratives suggest that he was

[15] Charles Gibson has described *haciendas* as the least coercive institution in its policies of labor (*Aztecs* 249). "Its role was one of progressive domination over land, over agriculture, and over other forms of supply, and as it dominated these, it necessarily extended its control over Indian labor" (Gibson, *Aztecs* 249).

not in favor of all aspects of the colonial enterprise. His accounts present a philosophical portrayal of natural products as Spaniards and indigenous peoples used them a means to negotiate and better understand a newly transatlantic world.

In his entry about a healing plant called *perebeçenuc*, Oviedo portrayed himself as chronicler, *hacienda* proprietor, and healer[16]. In these distinct roles, he simultaneously praised and condemned indigenous behavior, a seeming contradiction that was more likely a reflection of his ability to differentiate between various indigenous individuals and populations. He wrote about "the Indians [that] heal and cure; because they are great herbalists and they know many herbs, and have experimented with them" (*Historia* 365; pt. 1, bk. 10, ch. 2). Oviedo explained how these indigenous herbalists prepared a medicine for healing serious wounds. He first credited God for creating "leaves that wanted to resemble small spears, as if they wanted to teach men that they could heal the wounds caused by spears" (*Historia* 378; pt. 1, bk. 11, ch. 5), but never minimized the role of indigenous healers. Oviedo explained that there was a precise moment in which the plant should be cut, followed by a complex process for preparation and application of the remedy (*Historia* 378-79; pt. 1. bk. 11, ch. 5). Indigenous insight was therefore critical to the realization of the plant's healing properties.

Oviedo relied on his own experience to further determine the efficacy of a particular medicine. He stated that he had personally used *perebeçenuc* to heal many of his own workers, "some of [whom] had such wounds that the surgeon would have cost me tremendous monies, and I would not be assured that he would be able to cure them" (*Historia* 379; pt. 1. bk. 11, ch. 5). He questioned both the authority of conventional medicine and its relevance to circumstances in the West Indies. Oviedo concluded his description of *perebeçenuc* with an account of a group of

[16] Though *perebeçenuc* is considered a tobacco-like plant, it is unclear whether Oviedo is in fact speaking of tobacco (Colmeiro 16).

indigenous workers—"Indians I have had" (*Historia* 379; pt. 1. bk. 11, ch. 5)—who tried to avoid their required labor by rubbing another plant against their skin until it caused severe irritations that looked like wounds. After criticizing the Indians for their deviance, Oviedo praised the virtues of *perebeçenuc*, for quickly curing their injuries and returned them to their obligations. Through this anecdote, Oviedo described a process of appropriation of indigenous peoples' natural knowledge in which he, as *hacienda* proprietor, used that same knowledge to control indigenous behavior. He also portrayed the misguided laborers as knowledgeable, if devious, in that they turned to nature to escape their duties. Although Oviedo favored lashing the Indians as punishment for their rebelliousness, he also recognized and recorded the desperate desire of indigenous peoples to change their circumstances (*Historia* 379; pt. 1. bk. 11, ch. 5).

A separate entry on the *yuca* plant also shows Oviedo's conflicted stance toward requiring the indigenous population to fulfill labor requirements. In an echo of his description of *perebeçenuc*, he described *yuca's* physical appearance, common indigenous uses, and how Spaniards had adapted its uses to meet their needs. Oviedo noted that Spaniards had perfected *yuca* bread, but again credited indigenous peoples with essential knowledge, warning that, depending on the method of production, the result could be either a healthy porridge or a deadly poison (*Historia* 271, 272; pt. 1. bk. 7, ch. 2). He elaborated, noting that indigenous residents of the Island of Hispaniola used this poison to commit mass suicide. Interestingly, Oviedo offered two very different accounts of this same mass suicide in *De la natural historia de las Indias* (1526) and *Historia general y natural de las Indias* (1535).[17] In the first, he blamed indigenous

[17] Jesús Carrillo Castillo compiled a detailed analysis of Oviedo and his portrayal of the natural world during his charge as royal chronicler. His second work *Historia natural* was written only after he had obtained his royal charge and with it the parameters by which he was to compile his new work (74-80). Though many of the accounts he relayed are also included in his *De la natural*, Carrillo Castillo also points to significant differences between the two works.

leaders who convinced their congregation that their idols wanted them all to perish together (*De la natural* f.vii). The second account, written as royal chronicler of the Indies, made no reference to indigenous leaders, and only fleetingly to a demonic entity that impaired individual judgment. Oviedo's final description held deeper sociopolitical significance, in that the inhabitants of Hispaniola turned to mass suicide to escape their labor obligations; unwilling to "work or serve . . . in groups of fifty, more or less, they killed themselves with gulps of this juice" (*Historia* 272; pt. 1. bk. 7, ch. 2). Oviedo did not provide additional commentary assessing the incidents, but their inclusion and that Oviedo linked their motive to current labor conditions raise the question of whether the royal chronicler condoned the current colonial enterprise.

Oviedo provided another account of local people adapting their use of native products to unfavorable conditions of subjection. In his description of the *henequen* plant, Oviedo praised the cloth as "beautiful" and "gentle," and compared its quality and production method to that of European linen (*Historia* 277; pt. 1, bk.7, ch. 9). Oviedo followed the description with an anecdote describing a "new invention of the Indians taught by Nature" (*Historia* 278; pt. 1, bk.7, ch. 9). They used the *henequen* plant to:

> Cut fetters or a bar of iron in this manner. As one cuts or uses a saw, they move the *henequen* back and forth over the piece of iron that is to be cut, pulling the thread first one way and then another, and sprinkling very small particles of sand on the spot where the thread touches the iron, thus wearing out it is replaced by a strong new thread and the cutting is continued. In this way the Indians can cut a piece of iron, however thick it may be, and they cut it as if it were soft or something easily cut (*Natural History* 43).

Like the account of the mass suicides in Hispaniola, this anecdote differs significantly from Oviedo's initial version in *De la historia*. In his subsequent project he described the process of employing *henequen* to cut iron in identical terms but noted that indigenous people innovated this use only after the Spaniards "had taught [the Indians] to be shackled and imprisoned" (*Historia* 278; pt. 1, bk.7, ch. 9). Interestingly enough, Oviedo spoke of imprisonment as an act taught by Spaniards, and the curious *henequen* innovation as an act taught by Nature. Such assertions raise the question of whether Oviedo saw God, "Master of Nature" (*Historia* 361; pt.1, bk.10, Prohemio), as facilitating an escape from the unjust aspects of colonial rule.

Analysis of these passages aside, it is, of course, difficult to ascertain whether Oviedo actually felt conflicted about the state of indigenous labor, captivity, and depopulation in the West Indies. His writings on plants describe Spanish appropriation of botanical knowledge to serve Spanish needs at the same time that they detail indigenous innovations that used natural products to challenge their subjugation. This multiplicity is reflected in his descriptions of particular uses for the natural elements, as Oviedo's entries on *perebeçenuc*, *yuca,* and *henequen* did not privilege one use of the plant over another. These seemingly contradictory uses were simultaneous and equally valid responses to the current enterprise. It is also important to remember that Oviedo included and scrutinized the information he selected for his work. He reiterated: "and although I have heard some things said…I would not want and I am not accustomed to waste time in relaying things that are confusing or unclear, and thereby I will only share that which I deemed noteworthy, proven and witnessed by my eyes, or individuals that deserve credit" (*Historia* 378; pt. 1, bk. 9, ch. 5). The difference in which Oviedo discussed the same natural element in his first account and final version underscored discrepancies in how indigenous peoples used the natural product. It is also critical that Oviedo abstained from sharing

a significant amount of information. That Oviedo included the particular plant and related practices in his writing, in and of itself suggested favoritism, affinity, or information of critical importance. Though Oviedo presented practical information, he included multiple versions of the same account without specific reconciliation of the tensions. That he heightened awareness to labor and specifically how natural product connected to the liberation of local populations suggests that Oviedo also intended to convey a philosophical consciousness.

Andrés Laguna, Spanish court physician, elaborated on the role of plants and animals as philosophical elements. He explained the process in his annotated and translated edition of *De Materia Medica* (1555) by Greek soldier and physician Pedanius Dioscorides (40AD-90AD). In his dedication to king Philip II Laguna cautioned that one must consider nature for its utilitarian function and never in isolation of its philosophical paradigm. As the royal court physician, Laguna attempted to restore the physical and ethical health of the Spanish kingdom by means of his *Materia.* He presented his work as the most accurate rendition of medicinal knowledge related to earlier Arabic and contemporary Latin translations.[18] Working from Dioscorides' own manuscript in Greek, Laguna corrected some mistakes of copyists and translators who had interchanged the names of simple medicines, thus leading to fatal consequences (23; vol. 1).[19] For example, doctors had administered *cassia lignea*, or cinnamon bark, for *thapsia*, or deadly carrot, causing patients to live "in abeyance of the whim of some idiots who instead of a comforting remedy provide[d] an effective poison" (Laguna 6; vol. 1). Laguna's *Materia* also became the first vernacular edition in Spanish, thereby making medicinal remedies more

[18] Before Laguna's *Materia* information about medicinal natural elements, physicians obtained their knowledge primarily through translations of Avicenna's (980-1037) Arabic texts that had incorporated Hippo-Galenic medical traditions as well as content from Dioscorides' *De Materia Medica*. As a result of the humanist movement during the sixteenth century, scholars returned to the original manuscripts of the Greek authors instead of using intermediaries.

[19] Simple medicines were plants, animals, or minerals that acted alone to remedy an illness.

accessible to the general public. He perfected information and broadly disseminated its content to promote the health of the kingdom, but underscored that it was the philosophical engagement with nature that could bring about "the immortal benefit of the entire motherland" (22-23; vol. 1).

Laguna recognized the indissoluble link between nature, God, and political harmony. According to Laguna, God was the only "Creator" of nature and "our Supreme Architect" (21; vol. 1). Hence, nature, as God's creation, could be used to understand the will of the Divine. Each plant or animal offered the means by which to decipher the Universal secrets, and through its contemplation one could achieve a higher moral and ethical understanding. Laguna reminded readers that Aristotle and Pliny, ancient philosophers, had attributed a soul, or *anima,* to all natural elements and explained how one could relate the stages of mankind to those of plants (25; vol. 1). Laguna explained that the physiological behavior of plants and animals corresponded harmoniously to that of mankind, and underscored that the Divine virtues of natural elements should inform the moral code by which individuals and their sovereign rulers lived or were ruled by.

In particular Laguna spoke of natural elements that engaged in social and symbiotic relationships. Such plants,

> provide a clear example of equity and justice, for we see that every one of them remains in its own post (*asiento)* where it was transplanted without usurping (*usurpar)* or invading the space of its neighbors, and there are even some that giving us unique examples of charity and benevolence tend to embrace and harbor in their own bosom other diversity of plants that the earth had not allowed for. (Laguna 24; vol. 1)

Inferring that the behavior of nature was transferable to all mankind, Laguna suggested that individuals should refrain from seizing land that belonged to others and should coexist through equity, justice, charity, and benevolence. That concurrently the Spanish crown led a military enterprise to subjugate peoples, exploit natural resources, and appropriate territories across the Atlantic renders his commentary especially poignant.

Also striking is Laguna's dedication of his work to Prince Philip II. He followed the conventional protocol of writers seeking to benefit a royal enterprise. Still, Laguna's preamble suggests that the court physician employed his writing to provide the future monarch with political guidance and specifically with an approach to alter the current governance of newly acquired territories, peoples, and natural resources.[20] At the time, the monarchy was exhausting its military recourses to attain the political subjection of American territories (Bustamante, "Círculos" 50). Laguna proposed that the soon to be king acquire wisdom through nature's revelations. By contemplating nature, Philip II could align Spain's policies to God's will. As the plants had exemplified, the monarch ought to remain in his post, respecting the land of neighbors, and harboring in his bosom the diversity of peoples under his charge (Laguna 24; vol. 1). Laguna set in opposition nature's behavior, a reflection of God's Universal design, and the Crown's current imperial tactics; in doing so, he promoted alternative strategies for sociopolitical engagement.

Laguna also voiced his opposition to current political endeavors asserting that the Crown contradicted political behavior that Ancient Roman practice had exemplified. He underscored

[20] Nieves Baranda shares commonalities among the writings related to a prince's education during the early modern period. Baranda explained that in most cases those who provided insight into the correct rules of behavior of nobles, as well as the recipients of those instructions were unknown. Laguna's letter to Philip II is an exception because its reading provides us with insight as to what was the code of conduct for nobility and, as importantly, the historiographical context which dictated those norms, whether or not they were followed.

that Galen (129AD-200?AD), as Protomedic of the Roman empire, praised Marcus Aurelius (121AD-180AD) who along with other emperors had "held the reins an controlled the governance of the Universe because they were not as curious and solicitous to expand the limits of their empire as they were to preserve the health of its subjects, and they sought from far away regions not pearls or gold, but exquisite medicines" (Laguna 8; vol. 1). Laguna once again cautioned against the arbitrary territorial expansion and the launching of economic ventures led by greed instead of the wellbeing of others.

The court physician set the Art of medicine in opposition to the Art of Warfare and claimed that without the skill to heal, war captains would lack strength and vigor (21; vol. 1). Laguna recognized a point of contention between soldiers and doctors, and generalized that, "commonly the people of war apply less to those things that are of use and benefit to the public nor do they bother to procure life and health, but rather spill human blood" (8; vol. 1). He registered a philosophical objection to the current practice of warfare, and found in the figure of Dioscorides grounds for conciliation. Dioscorides himself was a soldier as well as a physician. However, Laguna underscored a distinction between current and ancient military strategies. Laguna defined the soldiers of antiquity as observers, learners, and gatherers of information and warfare as an opportunity that facilitated a soldier's pilgrimage to contemplate distant lands, people, and practices (8; vol. 1). Not unlike his exemplary plants, ancient soldiers did not seek to invade, alter, or destroy another's territory. Laguna inferred that avoiding military intervention and prompting an engagement with nature, which promoted the wellbeing of all, could align the monarchy's endeavors to Divine principles. Laguna did not limit himself to the dissemination of

medicinal knowledge, but rather instructed the future king to redirect his approaches to the colonial enterprise.[21]

Dissertation Synopsis

Spanish emissaries were not the only ones who offered alternative strategies to achieve the colonization or life *en policía* of local populations. The first chapter centers on the process of cultivation of the cochineal insect or *nocheztli* and the manufacture of its lucrative vermillion dyestuff. Unlike silk production, the process of cultivating and extracting cochineal dye was entirely an indigenous craft. Although Spanish colonizers facilitated its mass production and transatlantic commerce, they never compromised specialized indigenous techniques or the exclusivity of indigenous manufacture. In this manner, the cochineal industry bridged Castilian and indigenous commercial and industrial practices and interests.

Chapter two analyzes how Nahua historians used natural products as recourse to assess, challenge, and create sociopolitical strategies to serve the interests of their communities. In particular their narratives responded to the immediate deforestation and depopulation prompted by an unregulated timber industry. They admonished Spanish authorities and advocated for the conservation of timber and specialized woodcutters. I analyze works by Diego Muñoz Camargo (1529-1599), Fernando de Alva Ixtlilxochitl (1568?-1648), and Domingo Francisco de San Antón Muñon Chimalpahin Quauhtlehuanitzin (1579-1660) and explain how Nahua authorities, informants, and specialized workers, engaged with their past and current natural environment

[21] Jesús Bustamante enumerated Philip II's early undertakings that looked to nature and other "cultural enterprises" to benefit an empire. Bustamante underscored that Philip II reconstituted knowledge from an abstract concept and employed it as a practical instrument at the disposal of the republic to edify and legitimize its own existence ("Círculos" 57). Paula De Vos explained that Philip II's monarchy exercised a practice of Economic Botany in which the study of plants could achieve their mass cultivation for economic profit (400).

and subsequently influenced colonial conceptions of the natural world. Nahua attitudes toward nature significantly affected economic colonial policies and proposed exemplary social models that promoted more ecologically sustainable social alternatives of colonization under Spanish rule.

The third chapter corroborates how Nahua attitudes about nature had concrete effects on the reconstitution of indigenous sociopolitical experience. This chapter specifically identifies how the Nahua inserted ecological considerations, influencing the conservation of timber products and the welfare of woodcutters into Spanish economic discourse. I analyze Chimalpahin's historical annals along with unpublished ordinances to demonstrate the direct effect of the wood industry on indigenous communities. In an effort to curtail these unsustainable practices, the Nahua and Spaniards also proposed exemplary models for interacting with nature and models of collaborative colonial engagement among secular, ecclesiastic, and Nahua groups.

As we shall see in the forthcoming chapters, Nahua contributions went beyond influencing colonial agriculture and craftsmanship and also impacted the formulation of policies that centered on natural resources and had concrete effects on colonial societies. My dissertation analyzes how the Nahua responded to an immediate natural and human exploitation by modifying the current colonial agenda to address Nahua concerns or interests. I explain the role of natural products as points of engagement among European and indigenous participants and how "anxieties over environmental change mirrored social reforms" (Grove 14).[22] This project recognizes natural industries as conduits for environmental and social exploitation, but identifies

[22] As mentioned earlier, Grove limited the "human despoliation of earth" as well as resulting conservation strategies to the actions of settlers, ignoring the colonization process of the Spanish Americas and the critical involvement of Native Americans in the modification of their natural environment prior and after Spanish arrival.

in the cochineal dyestuff and timber industries as simultaneous sites in which indigenous agency safeguarded natural products, laborers, and patrimonial territories during the sixteenth century in central Mexico.

Chapter 1. The Cochineal Insect, Chichimec Nomadic Populations, and Tlaxcalan Identity[23]

> The wonder of mimesis lies in the copy drawing on the character and power of the original, to the point whereby the representation may even assume that character and power. (Toussig xiii)

Natural histories of the sixteenth century were similar in terms of their structure, content and tendency to connect natural elements to universal phenomena.[24] At a moment when Europe was capitalizing on newfound plant and animal species, natural histories served to introduce and authorize plants, animals, and minerals previously unknown in the Spanish commercial sphere. Writers reported a plant's or an animal's physical properties and attributed social or moral characteristics to it, using these traits to predict how well the natural element would transfer into a particular society or transatlantic trade circuit.[25]

Descriptions of *nocheztli* or the cochineal insect of New Spain generated particularly rich content about the product as well as its cultivation and use in dyestuff production. In the sixteenth century, Spanish and Nahua sources agreed that the cochineal of New Spain was a live worm and the source of a deep red pigment.[26] In this chapter, I analyze a number of sixteenth-

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[23]The Nahua state of Tlaxcala generally corresponds to the present-day state of the same name located east of Mexico City and along the eastern foothills of the Popocatepetl and Iztaccihuatl Mountains. The Chichimec nomadic people occupied territories to north of Mexico City that correspond to the present-day states of Zacatecas, Aguascalientes, Guanajuato, Jalisco, and San Luis Potosí.

[24] Some prominent Natural Histories written at the thime include works by Gonzalo Fernández de Oviedo, Francisco Hernández, Andrés Laguna, and José de Acosta.

[25] For a list of some prominent natural histories and herbals that described New World products, along with brief summaries of their contexts of production and influence on colonial and peninsular societies, see Daniela Bleichmar 84-87.

[26] There was some disagreement between Spanish and British dyestuff traders as to whether cochineal was a plant or an animal. Scholars including Raymond Lee and Jordan Kellman have speculated that the Spanish monarchy tried to keep cochineal's animal nature and the practices

century accounts about cochineal. Andrés Laguna (1499-1559), the Spanish court physician; Francisco Hernández (1514-87), the physician who was appointed the Royal Protomedic of New Spain;[27] Antonio de Herrera y Tordesillas (1549-1625?), the official Royal Chronicler; Fr. Bernardino de Sahagún (1499-1590), a Franciscan missionary and founder of the Colegio de Santa Cruz de Tlatelolco; Gonzalo Gómez de Cervantes (?), Governor of Tlaxcala (1584-85, 1596-98); and Diego Muñoz Camargo (1529-99), a Tlaxcalan civil servant and intermediary between the Tlaxcalan Indian government and Spanish authorities all included *nocheztli* in their histories or reports to the Crown. Though they described the same natural product, their portrayals of the insect and its breeders differed dramatically. In addressing *nocheztli*'s various attributes, each writer responded to and elucidated distinct aspects of the colonization process in Mexico. They each conveyed different political agendas and sentiments towards Soanish rule.

Muñoz Camargo added a brief appendix to the *Historia de Tlaxcala* (now known as Ms. 210) (1592?) that described how the Nahua people of Tlaxcala bred the cochineal insect and regenerated its host plant, the *nopal* cactus.[28] This report on cochineal was both a practical manual and an exercise in early modern natural philosophy. Muñoz Camargo sought to preserve

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for cultivating it from British entrepreneurs. In a future project, I will take a contrary view, arguing that the amount of information about cochineal that circulated made this highly unlikely.

[27] The Protomedicato was the royal body that regulated the medical profession. The Protomedic of New Spain was responsible for regulating the practice of medicine in the Spanish American colonies. For more information on the Protomedicato, see John Tate Lanning.

[28] Muñoz Camargo explained that cochineal "bred with the nourishment of the *nopalli*, because it does not eat anything else, and it is its primary nourishment, and so by a secret of nature it produces within it that blood-like color because of the correspondence it possesses with the fruit that is also red and blood-like despite the tree and its leaves being green" (287). Sahagún also described the relationship between animal and plant: "The cochineal *nopal* is the breeding place of the cochineal. It lives, it hatches on the *nopal* like a little fly, a little insect. Then it grows; then it develops; then it increases in size" (Sahagún, *General* 239; Bk. 11). The cochineal lived its entire life attached to the *nopal*, from which it also absorbed the vermillion pigment. As a parasite, the cochineal eventually killed the *nopal*, its host. The duty of cochineal breeders, therefore, was to maintain the equilibrium that would allow both plant and insect to thrive.

Nahua traditions while improving the sociopolitical standing of the Tlaxcalan under Spanish rule.[29] His work on cochineal promoted an innovative social project for the pacification of Chichimec nomadic groups of northern Mexico: instead of the military force that had already proven a failure, the Tlaxcalan could use agriculture, mechanical arts, and commerce to subdue these groups. Muñoz Camargo's report went beyond a factual description of the parasite that produced the blood-red dyestuff to portray both the insect and the skilled Tlaxcalan breeders as critical agents in a universal economic, social, and political endeavor.[30]

Early Descriptions of the Cochineal Insect of New Spain

Early writings on cochineal demonstrate the relationship between descriptions of this commodity and sociopolitical and economic policy. Each author alluded to different aspects of the colonization process and shared his own vision of how authorities, indigenous populations, and natural products ought to engage with one another for the benefit of the colonial enterprise.

Laguna was one of the first to publish a detailed description of cochineal of the New Spain. He included it in *De Materia Medica*, the text that scholars now call his "Dioscorides," in an annotation to an entry on "*Grana para los tintoreros*" or "Dyers graine" (41-42; vol. 2).[31] According to Laguna, the wormlike insect produced a rich vermillion dye. He also asserted, contrary to the opinions and first-hand accounts of Spanish settlers who had actually seen the insect, that the cochineal insect of New Spain was not the dyers graine called *coco gnidio* that

[29] The Tlaxcalan became allies of the Spanish conquerors during Hernán Cortés's campaign against Tenochtitlan, a position that earned them considerable freedom under Spanish rule.
[30] I use the word "universal" in the natural philosophical sense, that is, to describe the application of a set of behaviors, actions, or historical events to general circumstances and especially to Christian principles or narratives.
[31] The Spanish word *grana*, or grain, became a popular colloquial term for cochineal, and was adopted in other European countries as grain or graine (Kellman 388f24). For an explanation of the etymology of "cochineal," which is derived from the Greek word *kòkkos*, meaning "grain," "seed," or "berry," see Jordan Kellman 388f24.

Dioscorides had described. Instead, the court physician argued, based on his own knowledge and academic experience, that Dioscorides's "insect" was really *torvisco,* a type of evergreen daphnia.

Through his account, Laguna certified that the cochineal of New Spain really existed, but he also challenged the testimony of curious laymen. Curious laymen had been the source of many important observations about natural elements of the New World (Monardes f.57). It would not be long before the monarchy moved to centralize and institutionalize processes to authorize new natural products and empirical practices to collect, verify, and disseminate newfound information.[32] At the same time, the physician drew on ancient knowledge, exemplifying the tensions between new and pre-established knowledge, as well as practical and theoretical knowledge.

Decades later, in response to a perceived need to verify autochthonous information about plants, animals, and minerals of the New World, King Phillip II designated Francisco Hernández the Protomedic of New Spain. The protomedic was required to officially catalog the region's natural elements, with a mandate to "understand, learn, and give an account of all of the medicinal herbs, trees, plants, and seeds that prevailed in a given province" (*Recopilación* f.159). The protomedic needed to "experiment and have proof of everything possible, and if it is not, they should inform themselves through experts, so that certified of the truth, they relate to us their use, capacity, and temperament" (*Recopilacion* f.159). Hernández, following his

[32] Antonio Barrera Osorio has detailed the Spanish monarchy's strategies for certifying practical and previously unknown information as knowledge. The *Casa de contratación* or House of Trade and the Council of the Indies authorized eyewitness testimonies about and practical experiments on previously unknown natural products. Highlighting the tension between practical and theoretical knowledge, Barrera Osorio has identified the House of Trade, Council of the Indies, and viceregal court as spaces that served as an alternative to the university, places where soldiers and other laymen could contribute to the production of knowledge.

instructions, identified and categorized nature.[33] He also addressed the potential for "information, communication, and the commerce of some plants, herbs, seeds, and other medicinal things that could lead to the cure and health of human bodies" (*Recopilación* f.159).

Hernández recognized the connection between nature, commercial interests, and theoretical considerations.[34] His reports linked plants, animals, and minerals to commerce, stressing human welfare and economic benefits. For example, Hernández urged replacing European products, particularly medicines, with those produced in the New World, in order "to excuse a great expense" to the Crown (Medina 282, 283). In keeping with his scholastic education, he followed classical models to systematically collect information on previously unknown elements. He was likely guided by another project that he was working on at the same time, a translation of Gaius Pliny's (23 AD-79 AD) *Natural History* from Latin into Spanish (Medina 280). The protomedic appears to have relied on Pliny's work to give form and authority to the *Historia de las plantas de la Nueva España*. Hernández quoted Pliny: "It is a very difficult act to make old things new; and to those that are new bring authority; and to luster to those that we are accustomed to; and to those in the dark bring light; and to the displeasurable, grace; and the dubious ones, faith" (6).[35] To Hernández, the fact that the classical philosophers had faced a similar burden justified his own collecting and writing, and validated autochthonous uses of plants, animals, and minerals.

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[33] Although we do not know for certain when Hernández wrote his entry on cochineal, letters to the court indicate that he had compiled at least ten volumes of information by 1574 (Medina 279).
[34] This recognition may have reflected the adoption by King Phillip II of Charles V's notion that "commerce" would teach indigenous people Christian practices. Voluntary exchange of goods, it was believed, would not only generate economic benefits but also "prompt [the Indians] to grow to love us" (Encinas 249).
[35] Gonzalo Fernández de Oviedo (1478-1557) used this same statement to lend authority to his *Historia general de las Indias* (1532) (5; bk.1, ch. 1).

Curiously, however, Pliny's statement could have discredited classical knowledge as obsolete. In a letter to the Spanish court, Hernández explained that even Dioscorides, *the* authority on *materia médica*, could account for only six of the varieties that Hernández and his indigenous physicians and botanists included in their ten volumes of material (Medina 279). Like Laguna before him, Hernández bridged conventional knowledge and indigenous empirical practices in negotiating the challenge of identifying and authorizing new elements. Rather than dismiss classical authorities, Hernández used them as a complement to his collaboration with indigenous physicians and botanists. In this way he linked practical understanding of these new natural elements to the theoretical debates of the era.

In another letter to the court, Hernández identified his sources and their processes for certifying information. He offered the king descriptions of natural elements "according to the accounts of indians, through the experience that they have had over centuries. . . . I asked over twenty indian doctors, each one alone, and I considered in what ways their accounts differed or were similar, and I regulated and confirmed with what I experienced" (Medina 275-76). Although it might appear that Hernández sought to appropriate indigenous knowledge, his entry on *nocheztli* frames indigenous empirical practices as a logical complement to the gaps in ancient knowledge.

Hernández described the cochineal insects as small worms, white on the outside and red on the inside (Hernández, *Historia* 942). He briefly noted its medicinal properties before describing the unique vermillion dyestuff that it produced in greater detail. According to Hernández, the product was only found among Mexicans, and it only grew on *tuna* trees that were protected from cattle. As expected, Hernández used European paradigms as a frame of reference for classification of the species, its behavior, and its uses. He claimed that the insect

should be classified as *coccum* or grain (*Historia* 943, 944). Hernández then praised the cochineal's crimson dye and compared its Nahua production to those of a similar ancient practice. In agreement with Laguna, Hernández concluded that the Mexican insect was unlike any known grain, asserting definitively that the ancient product and its use were no longer extant (943-44).

Despite his reliance on classical categories and practices, Hernández presented the insect as a wholly Nahua product. The protomedic introduced the insect as *nocheztli* and used the Nahuatl term throughout his text, to convey that the Nahua, and not Spaniards, possessed the necessary knowledge for breeding it and extracting its dyestuff. Noting that the ancient insect that had served as a source of vermillion dyestuff was extinct, Hernández asked whether "perhaps the world will once again seek it, never satiated with new inventions, always variable and restlessly enterprising (*inquieto)*" (944).[36] The protomedic inferred that *nocheztli* could be this new invention. Although Hernández did not speculate as to the possible effects of mass production of *nocheztli* on Nahua populations, he was the first to frame it as a Nahua contribution and a viable substitute for other vermillion dyestuffs (944).

Antonio de Herrera y Tordesillas (1549-1625?), acting as the Royal Chronicler for King Philip III, published his description of the cochineal insect in 1602. His account serves as a point of contrast with both Laguna's and Hernández's versions, but also demonstrates cochineal's easy entry into central Mexican colonial society and global commerce circuit.[37] Herrera spoke of the world's high regard for the insect and its dyestuff. Like the earlier writers, he described its animal origins, its cultivation, and production of its pigment. Herrera noted that cochineal was a

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[36] *Tesoro de la lengua* (1611) defined *inquieto* as "a friend to novelty, restlessness: from that anxiety" (Covarrubias f.505).

[37] Herrera originally published his *Décadas* under the title *Historia general de los hechos de los castellanos en las Islas y Tierra Firme del mar Océano que llaman Indias Occidentales*. It was quickly translated into various languages (Ballesteros-Beretta lxxv-lxxvi).

native product, but contrary to Hernández, he also asserted that Spaniards had taught indigenous people how to obtain and use the vermillion dyestuff (169). He contradicted this claim in the same paragraph, when he noted that "the Tlaxcalan, producers of the finest cochineal, do not want to uncover the secret of how it is produced" (Herrera 170).[38] If, as he claimed, the Spanish were the source of this knowledge, then the idea that the Tlaxcalan tried to withhold this information made no sense. Herrera also confessed in the *Decadas* that he had access to writings by Muñoz Camargo about cochineal and an anonymous report titled *Cómo se cría la grana cochinilla* or *How to cultivate the cochineal grain* (Ballesteros-Beretta lxxii, lxxv). It appears that Muñoz Camargo personally handed a copy of his cochineal appendix along with his *Historia* to King Phillip II (Acuña, "Intro" 17-18; Reyes García 34). As we will see throughout this chapter, Herrera's account resembles Muñoz Camargo's appendix, suggesting that Muñoz Camargo shared his information with Herrera as well as the king. Such cooperation further calls his claim of Tlaxcalan secrecy into question. Herrera's allegations nonetheless highlight the tensions in the production of knowledge about New World natural elements and the attempts of the Spanish court to understand them.

The Sociopolitical Connection Between Cochineal and Silk

As Laguna, Hernández, and Herrera all suggested, natural elements were inextricably linked to sociopolitical initiatives. In 1577, the Spanish monarchy used a fifty-item questionnaire titled "Instrucción y memoria de las relaciones que se han de hacer para la descripción de las indias, que su majestad manda hacer para el buen gobierno y ennoblecimiento de ellas" to obtain a detailed report about the flora, fauna, geography, and social practices of each region of the

[38] Herrera noted that Tlaxcala was not the only region to produce cochineal: "It is also bred in Cholula, Guaxozingo, Calpán, Tranguyz, Manalas, in the High and Low Mixteca region and nearby towns to Oaxaca and Tecamachalco" (170). He was quick to point out, though, that Tlaxcalan cochineal was the finest and highest quality.

New World. Spanish authorities sought this information about the natural world of the newfound territories in order to further commercial ventures and inform the social restructuring of indigenous communities. The responses to this questionnaire, commonly known as *Relaciones geográficas*, contained information on the natural elements found in specific regions as well as other valuable information about the territories (Acuña "Intro").[39] Although the regional reports responded to a more explicit mandate, they were like the reports by Laguna, Hernandez, and Herrera in suggesting that the skillful administration of natural products would serve colonial interests.

That the cultivation and production of cochineal dyestuff had become a colonial enterprise was demonstrated by the specific reference to it in the "Instrucción y memoria." The questionnaire asked about the presence of silk and cochineal in each jurisdiction. Under the subheading, "Trees that are indigenous as well as imported, seeds, grains, and vegetables. Their uses," question twenty-five asked, "Of those which have been taken from Spain, and whether the land produces wheat, barley, wine, and oil and in what quantity are they harvested, and if there is silk or cochineal across the land and in what amount" (Solano 84). By including the dyestuff along with silk in the questionnaire, Spanish authorities designated cochineal a transatlantic commercial commodity with the potential to impact the reorganization of indigenous communities.

Colonial authorities had already deployed cultivation and the mechanical arts as tools in managing both natural resources and indigenous populations. In the 1530s, Fr. Juan Zumárraga (1468-1548), Archbishop of Mexico, proposed the cultivation of profitable autochthonous and

[39] Though this particular questionnaire sought information on the territories of the New World, Spanish authorities modeled it on questionnaires disseminated throughout peninsular Spain to gather geographic information about its various regions (Solano 75-79).

transplanted plants and animals as a means of settling and stabilizing New Spain. Zumárraga believed that profitable engagement with natural products could help both Spaniards and indigenous peoples to achieve a stable, settled lifestyle. He explained that silk production in particular would allow Spaniards, Native Americans, and *Moriscos*, or Muslims who had converted to Christianity, to learn from one another:

> And thus we have seen that silk is reared here and its industry practiced primarily among indians in order to flourish it would be of great benefit . . . for his Majesty to require married *Moriscos* to come . . . and introduce the art of cultivation to the indians so they may profit from it, for according to their ways they will devote themselves to its rearing . . . in this way, gold and silver would not leave our land as often, it would stay and enrich it and the Spanish and indian vassals would become rich, and a rich town makes a rich king. (García, app. 113)[40]

As mentioned in the Introduction, Spanish authorities encouraged teaching specialized mechanical arts to indigenous people, and Zumárraga even urged the king to permit and encourage *Morisco* craftsmen to immigrate to the Americas to instruct indigenous peoples in the art of making silk. Zumárraga's request came at a moment when the monarchy, citing irreconcilable religious differences, had prohibited Jewish and *Morisco* populations from settling in the newfound territories. As we shall see, that the Archbishop prioritized the dissemination of mechanical knowledge over the safeguarding of religious purity indicated something about its

[40] Robert Ricard and Karoline Cook have stated that the king never agreed to Zumárraga's orders and the *Moriscos* never came. While Ricard does not state his source, Cook attributes this assertion to Woodrow Borah who stated, "The recommendations were favorably received, and an order was issued to send the *Moriscos* and to pay their expenses" (9). Borah credited Joaquín García Iczbalcetas collection of documents written by Zumárraga, but such license does not appear. Borah continued, "We have no record that the *Moriscos* ever arrived, although there certainly were a few in the New Spain some years later. Whether they were the ones sent for by the bishop, they may have helped to teach silk culture either to the Spanish or the Indians" (9).

importance.

According to the Archbishop, the benefits of transferring agriculture and craftsmanship included promoting the permanent settlement of all groups. A domestic silk industry would also decrease royal spending and redirect indigenous labor to a fixed, stable, local economy. Spanish authorities thus saw domestic and transatlantic benefits to silk production in Mexico, primary among them being facilitation of a seamless transition of indigenous people into Spanish colonial society.

Gómez de Cervantes: Spanish Interests and Cochineal as a Parasite

Like Zumárraga's petition, mandatory reports on the natural world continued to propose uses for nature in the restructuring of indigenous communities.[41] Gómez de Cervantes, Governor of Tlaxcala, submitted such a report on cochineal to the viceroy.[42] He described the worm and practices relating to its cultivation, production of dyestuff from it, and trade in that commodity. He noted that raising cochineal and producing dye was a traditional Nahua practice and argued that the contributions of skilled breeders and producers to the industry would benefit both the monarchy and Nahua participants.

Gómez de Cervantes lived in Tlaxcala. In the colonial hierarchy, the governor was the highest regional judicial authority, "superior to the native Indian judges and inferior to the viceroy, the Audiencia, and the royal authorities in Spain" (Gibson, *Tlaxcala* 74). As governor, he sporadically participated in the Indian *cabildo*, although only when the group discussed

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[41] Barrera Osorio has discussed the role of mandatory reports in the institutionalization of empiric practices. In "Experiencia and empirismo," he explored Antonio Villasante's fieldwork and monopolization of a particular medicinal balsam.

[42] Although this information was published in 1599 as part of *La vida económica y social de Nueva España*, an extensive account of social and economic life in New Spain addressed to the *oídor* of the Council of the Indies, Gómez de Cervantes wrote that Viceroy Luis de Velasco had requested the information on cochineal.

matters relevant to Spanish interests, such as official elections or the enactment of laws, and even then he only voted in the event of a tie (Gibson, *Tlaxcala* 72-73).[43] Since any interaction between the governor and the Tlaxcalan *cabildo* took place in Nahuatl, an interpreter was required. Unlike other provinces of Mexico, the multistep process for enacting laws in Tlaxcala required the approval of both the governor and the Indian *cabildo*. As a result, Tlaxcalan governors issued "specific" legislation that required *cabildo* approval, and approved legislation that the *cabildo* presented to them (Gibson, *Tlaxcala* 73). Governors were also involved in the development of social programs to improve indigenous welfare. Other duties included overseeing the construction of public works such as bridges and roads, which also spoke to a concern for indigenous welfare (Gibson, *Tlaxcala* 75).

Gómez de Cervantes's report on the cochineal insect proposed one of these social programs. As a political emissary, Gómez de Cervantes did not follow the conventions of natural historians in his writing. He discarded classical scholarship and textual models to instead rely on his own experience, controlled experiments, and illustrations.[44] Gómez de Cervantes also compared the benefits of a cochineal industry to those of silver mining, thereby and strategically highlighting the potential for royal economic profit inherent in his social program (163). His

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[43] *Cabildo* refers to both a municipal council and a regional Indian council. It was the "chief political institution of towns" (Gibson, *Aztecs* 166). The Spanish *cabildo* was staffed by Spanish officials and oversaw political and judicial matters. There was only one Spanish *cabildo* in the Valley of Mexico, in the New Spanish capital of Mexico City (Gibson, *Aztecs* 167). Indian *cabildos* came to replace pre-Hispanic political structures, and existed in all prominent indigenous jurisdictions. In addition to local political and judicial matters, the *cabildo* was responsible for collecting and delivering tribute to Spanish authorities and serving as representatives of their community (Gibson, *Aztecs* 179).

[44] By the 1590s, this had become the preferred approach to obtaining information about products native to American territories. This more focused and empirical approach also reflects the nature of Gómez de Cervantes's project. Unlike Hernández or the writers that responded to the 1577 questionnaire, who had a mandate to provide general information about their respective regions, Gómez de Cervantes had been assigned to propose practical solutions to a specific concern, namely, the decline in cochineal production.

proposal was simple: to increase cochineal production and transform the Nahua people into constructive participants in society. He urged:[45]

> his majesty to mandate that cochineal *tunales* be planted in locations of this kingdom where it was deemed convenient, and that persuading them to do so, the indians would grow them, so besides a general welfare of the kingdom that would ensue, it would be of use and advantage to the very indians, which are so childish that they will remain in whichever task they are put to. (165)

Gómez de Cervantes characterized "the indians" as capable but passive, needing constant oversight in and rewards for their labor (170). Unlike Herrera, Gómez de Cervantes acknowledged that cultivation of the insect and manufacturing of the dyestuff was a traditional native practice, but he denied indigenous people any claim to the transatlantic dimension of the industry (164). He attributed the growth of the industry entirely to Spanish efforts and Castilian demand for the dyestuff, and he blamed a decrease in production on "lazy and idle" workers (Gómez 163).

Though Gómez de Cervantes claimed that local people depended on the Spanish crown to survive in colonial society, he also described the highly specialized Tlaxcalan breeding and production practices.[46] He called the manufacture of the dyestuff an *arte* or craft, with an intricate method and specific rules (Gómez 174). In order to harvest the cochineal,

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[45] Although Gómez de Cervantes referred to the cochineal breeder as an "indian," we can infer that he was talking about Tlaxcalan cultivators. His testimony and experiments were likely informed by his observations of Tlaxcalan practice.

[46] Jorge Cañizares-Esguerra, in his study about the scientific world of the Spanish empire, has grossly oversimplified the colonization experience, stating:

> Colonists in Spanish America were not interested in arguments in defense of the Americans . . . after all, these groups had long profited from representing the Amerindians as indolent phlegmatics who needed to be disciplined to get them to

> the indian that is to gather it must have in the left hand a vessel they call a *jícara* . . . in his right hand the indian must have a wooden staff (*puntero*) with a point as thin as an awl . . . and subtly pull out and detach the cochineal from the main rib of the *nopal* . . . and this ought to be done in such a way that with each stroke (*a las vueltas)*, [the indian] should not pull out or remove the cochineal that is not yet formed . . . and in such a way continue removing it with great skill *(buena maña)* . . . mindful always that one is never to touch with one's hand the main rib of the *nopal* . . . to touch it with a single finger would sicken, dry out, and yellow the main branch and would kill and waste the cochineal that remains attached. (Gómez 168)

The cochineal breeders skillfully distinguished fully developed and gestating insects, and then meticulously collected the grain in order to protect the remaining insects and the *nopal*. The report also exhaustively explained how the "indians" dispersed the cochineal seed (Gómez 166-67), protected it from predators (Gómez 172-73), ensured that it was well-nourished (Gómez 170-71), and also regenerated, transplanted, cured, and fenced off its host tree (Gómez 168-72).[47] Like other informants, Gómez de Cervantes gave no indication of Spanish participation in the cultivation of cochineal, portraying the industry as the exclusive domain of highly skilled Nahuas.

> work. From the outset of the conquest, Amerindian forced labor became a vital institution of the Spanish Empire (83-84).

Although Gómez de Cervantes's characterization of indigenous people could be cited as support for this argument, a careful reading reveals the tension between the drive to exploit labor and to conserve it.

[47] Although cochineal is an insect, Gómez de Cervantes used the word *semilla* or seed, describing the "seeds" as diminutive grains similar to nits (166-67). The inaccuracy of the language that he and other writers used both contributed to and reflected the confusion as to whether cochineal was an animal or plant.

At the viceroy's behest, Gómez de Cervantes conducted an experiment to determine whether the method of killing the cochineal insect impacted the quality of the dyestuff. His conclusions further identified the Tlaxcalan people as the sole breeders and producers of the dyestuff.[48] Gómez de Cervantes acquired two and a half pounds of live cochineal, and proceeded to use five different methods to kill the insect before producing the dyestuff (174-76). The results, which were based on the testimony and experience of an array of Spanish and indigenous expert witnesses, were that none of the five methods yielded superior dyestuff. Gómez de Cervantes did, however, recommend against the most time-consuming approach because of the "harm it does to the indian who rears it" (176). From cultivation of its host plant to manufacturing the vermillion dyestuff, Gómez de Cervantes attributed the success of the entire process to skilled indigenous labor.

The governor of Tlaxcala was thus deeply contradictory in his representation of "Indians," who were "lazy and idle" and yet highly skilled cochineal breeders. By making the "indians" the only agents in his description of cochineal dyestuff production, Gómez de Cervantes gave support to the argument that it was the Crown that depended on Tlaxcalan knowledge and expertise to rebuild the transatlantic cochineal trade, and not the other way around. He had, after all, attributed the industry's decline to a lack of participation by indigenous workers (Gómez 163). Although he stressed the inability of the Tlaxcalan to live independently of the Crown,

[48] Though Gómez de Cervantes published the *Vida económica y social de la Nueva España* in 1599, there is a clear correlation between the information in that report and the cochineal ordinances enacted by Viceroy Luis de Velasco in 1592. For example, Viceroy Velasco made reference to the outcome of this experiment and Gómez de Cervantes's conclusion that the method of killing the cochineal did not affect the quality of its pigment and that any inferior dyestuff was a result of its later mishandling (176). The 1592 ordinances stated: "by this same ordinance it is left to the judgment of the breeders to bring death to the cochineal as they please, so long as it is not by fraud, that which is corrupted will be deemed lost" (Alzate, "Memoria" 297).

Gómez de Cervantes simultaneously acknowledged their critical role in the production of the dyestuff. His report privileged empirical practices to explain the interdependence between the cochineal insect, specialized breeders, and effective governance of the Tlaxcalan under Spanish rule.

Cultivating Tlaxcalan Autonomy: Transferring Natural Products and Cultural Identities

Although Muñoz Camargo and Gómez de Cervantes both focused on cochineal's morphology, physiology, and breeding practices, they nonetheless proposed significantly different visions of the insect and the Tlaxcalan people. Both wrote official reports, but Muñoz Camargo's appendix can also be read as an example of colonial natural philosophy. It is likely that Muñoz Camargo, a prominent businessman and liaison between Spanish authorities and the Indian government of Tlaxcala, discussed the cochineal insect and its potential sociopolitical benefits for Tlaxcala with Gómez de Cervantes. The two men overlapped in the Tlaxcalan political sphere, Gómez de Cervantes as governor of Tlaxcala (1584-85, 1596-98) and Muñoz Camargo as official interpreter (1566, 1568, 1573, 1581, 1586, 1596-98) (Reyes García 17).[49] As *ad hoc* member of the Nahuatl-speaking Tlaxcalan *cabildo*, the governor must have relied on Muñoz Camargo to interpret the proceedings (Gibson, *Tlaxcala* 72). It also appears that Gómez de Cervantes had access to Muñoz Camargo's work, as Gómez de Cervantes's published memoirs included a set of illustrations thought to belong to Muñoz Camargo (Figs. 1 and 2). The anonymous pictorial manuscript that the governor included in his report may even have been a copy of the illustrations Muñoz Camargo personally gave to King Philip II (Reyes García 30-31).

[49] These are the dates on documents that Muñoz Camargo signed as official interpreter. In 1583 he served as *teniente* or aide to the governor. In 1586, he was named *procurador* by the Spanish governor. His duties included administering the assets of the province and serving as legal advisor to the Indian government of Tlaxcala (Gibson, "Identity" 201-04).

Figure 2. Images I and II from "Anonymous Pictorial Manuscript" in Gonzalo Gómez de Cervantes, *Gomez de Cervantes' Memorial and the Anonymous Pictorial Manuscript / Memorial de Don Gonçalo Gomez de Cervantes del modo de vivir que tienen los indos, y del beneficio de las minas de la plata, y de la cochinella. / Relación de [lo] que toca la Grana Cochinilla* (1599). Collection of the British Museum. Web. 14 July 2015. http://www.britishmuseum.org/research/collection_online/collection_object_details/collection_image_gallery.aspx?partid=1&assetid=269251001&objectid=3027127.

Figure 3. Images III and IV from "Anonymous Pictorial Manuscript" in Gonzalo Gómez de Cervantes, *Gomez de Cervantes' Memorial and the Anonymous Pictorial Manuscript / Memorial de Don Gonçalo Gomez de Cervantes del modo de vivir que tienen los indos, y del beneficio de las minas de la plata, y de la cochinella. / Relación de [lo] que toca la Grana Cochinilla* (1599). Collection of the British Museum. Web. 15 July 2015. http://www.britishmuseum.org/research/collection_online/collection_object_details/collection_image_gallery.aspx?partid=1&assetid=269253001&objectid=3027127.

The privileged son of a prominent *conquistador* and a Tlaxcalan noblewoman, Muñoz Camargo obtained an elite education. Though it is unclear whether he attended the Colegio de Santa Cruz in Tlatelolco, a Mexico City educational institution exclusively for indigenous nobles, Muñoz Camargo's work reflected the characteristics of such instruction. Students of the Colegio became proficient in Spanish, Latin, and Nahuatl. The curriculum blended scholastic thought with sanctioned Nahua practices and ideological frameworks.[50]

Muñoz Camargo authored more than one "History" of the Tlaxcala region, and a comparison of these different versions reveals different agendas behind his writing as well as different aspects of the social context of the time. The *Relación general de Tlaxcala* (*Relación),* currently classified as Ms. 242 and housed at the Hunterian Museum Library of the University of Glasgow in Scotland, was both a response to the 1577 royal questionnaire and an early draft of his 1592? *Historia*. It was this manuscript that he personally handed to King Philip II between 1584 and 1585. The *Historia*, or Ms. 210, titled, "Pedazo de Historia de la ciudad y provincia de Tlaxcala y su república por Diego Muñoz Camargo. Escrita en 1576. Volumen de 64 fojas numeradas de la 30-93" (*Historia* 7) and housed in the Bibliothèque Nationale de Paris in France, can be considered a continuation or revision of the earlier draft that he gave to the king.[51]

In the *Relación*, Muñoz Camargo made a point of not describing the production of the cochineal dyestuff:

> so many authors have written about [natural resources] that it would be superfluous for me to engage in the topic; Because the Protomedic that his Majesty has sent to this land took with him numerous exhaustive written accounts that there is no need for me to refer to them. Least of all will we deal with herbs

[50] For more on Franciscan educational institutions like the Colegio, see Elena Estrada de Gerlero.
[51] Luis Reyes García has noted the inaccuracy of the date of composition as stated in the title (7).

> and their medicinal roots, or about other plants and flowers as well as their diversity and their various colors, or about the plant that they call *tuna* of the cochineal insect and the way in which the natives cultivate it. (269)

In contrast, the *Historia* promised to take up the description in another writing:

> Least of all will we deal with herbs and their medicinal roots, or about other plants and flowers as well as their diversity and their various colors; or about the plant that that they call *tuna* of the cochineal insect and the way in which the natives cultivate it though following this [historical] account, we will provide a long account of it someplace. (269-70)

That Muñoz Camargo did not elaborate on the cochineal insect in his initial response to King Philip II highlights the significance of its eventual inclusion. Muñoz Camargo also explicitly noted in his *Historia* that he had given King Philip II a separate natural history of cochineal, complete along with a pictorial account (*Historia* 285).

Like Gómez de Cervantes, Muñoz Camargo acknowledged the intricate process for cultivating *nocheztli*, firmly rooting it in the Nahua past. Muñoz Camargo described how the Tlaxcalan cared for and regenerated the *nopal*, methodically pruning the plant in bunches of two or three leaves, depending on the richness of the soil, "more or less" every two years (*Historia* 289). They then left the leaves to dry for some fifteen to twenty days, or until the sun removed "part of the humidity" (*Historia* 289). He emphasized that cochineal breeders ultimately had to rely on their own judgment and experience in determining when to cut and how long to dry the leaves, and that miscalculations could cause the tree to rot when the stalk was replanted.

In another echo of Gómez de Cervantes's report, Muñoz Camargo depicted cultivation of the cochineal insect and regeneration of the host plant as a highly specialized and subjective

practice. Still, these two writers portrayed the Tlaxcalan breeder very differently. Unlike the contradictory *indio* of Gómez de Cervantes's account, Muñoz Camargo explicitly praised the "Tlaxcalan" cultivators of the richest and finest cochineal.[52] To Muñoz Camargo, the knowledge and practices around *nocheztli* and its vermillion dyestuff were Tlaxcalan patrimony, and he believed it should stay that way: "the Tlaxcalan should remain in charge of this industry, and not abandon it for as a delicate and intensive deed, Spaniards do not practice it" (*Historia* 290). He advocated expanding Tlaxcalan production, since only the Tlaxcalan had the necessary practical experience: "This is a well established fact among the Indians who grow and cultivate it, and one cannot hesitate or cast doubt upon it, it is a business that we come to experience every day of its practice" (Muñoz, *Historia* 289). In validating the Tlaxcalan as authorities in the propagation and maintenance of the insect and its dyestuff, Muñoz Camargo distanced Tlaxcalan knowledge from Spanish practices and highlighted its empirical character.

In addition to stressing *nocheztli*'s Tlaxcalan origin, Muñoz Camargo's account also emphasized the natural processes that occurred between the plant and animal species and demonstrated that Muñoz Camargo was versed in natural philosophy. He called the vermilion dyestuff a *qualitates occultae*, or secret of nature (*Historia* 287), the result of a hidden process

[52] Like Herrera, who had noted that a number of regions produced cochineal but insisted that Tlaxcalan cochineal was superior, Muñoz Camargo claimed that the *silvestre* or wild Mixteca cochineal was vastly inferior to fine Tlaxcalan *nocheztli*. It is also worth noting that most scholarship on cochineal dyestuff, including the studies by José Antonio de Alzate y Ramírez, Barbro Dahlgren, Amy Greenfield, Jordan Kellman, R. A. Donkin, and Raymond Lee, does not make use of Muñoz Camargo's *Historia*, which includes the cochineal appendix. In addition to promoting Tlaxcalan cochineal and labor over their Mixtecan counterparts, Muñoz Camargo's statements may also indicate that botanists and others were fighting for control of a domestic industry. See Yanna Yannakakis for deailed analysis on the cochineal and the Mixteca region as well as the Mixtecan strategies for resistance to colonial rule.

that indicated a deep connection between the *nocheztli* and its host plant.[53] This connection extended to the breeder, and even the larger society, as its effects were experienced broadly.

Muñoz Camargo strengthened his argument by comparing the cochineal insect to the silkworm. Informants often connected the two insects. As other writers had noted, the silkworm and cochineal insect were linked by their biological behavior, industrial possibilities, and the approach of natural philosophers to them.[54] As noted above, the 1577 royal questionnaire asked about the two natural products in the same question, a linkage that implied cochineal's profitability and commercial potential. Gómez de Cervantes and Muñoz Camargo both recognized the morphological and physiological similarities of these two wormlike parasites that fed on host trees (165; *Historia* 287, 288). By discussing the two products together, Muñoz Camargo suggested that he, too, understood them to be analogs. Muñoz Camargo, however, went a step further, contrasting silk and cochineal to emphasize the perceived connection between *nocheztli* cultivation and Tlaxcalan identity. Unlike silk, he argued, the cultivation and use of *nocheztli* had been part of a Nahua tradition long before the Spanish conquerors had arrived (*Historia* 286). Muñoz Camargo classified the silkworm as a transplanted insect that brought with it a product and an industry previously unknown to the Tlaxcalan; *nocheztli*, in contrast, was an inherently Tlaxcalan insect, product, and industry. Unlike the silk industry, cochineal dyestuff production did not represent the imposition of foreign practices onto a colonized

[53] According to Lawrence Principe, these hidden qualities were acts that could not be perceived by the senses: "these qualities often acted in highly specific ways, suggesting a special, invisible connection between specific things and the objects they acted upon" (29). He has defined *magia naturalis* as the attempt to understand and make use of these hidden qualities of things (29).

[54] Principe has explained that early modern humanists sought to connect similar natural elements to "extrapolate thence into a more universal statement—a law of nature—about connections and the transmission of influences in this world. . . . This exploration led to one tenet . . . that similar or analogous objects silently exert influence upon one another" (35).

population. Instead, cochineal marked the inclusion and propagation of local practices within a transatlantic economy and society.

Like other writers of the era to describe the silkworm, Muñoz Camargo followed natural philosophical tendencies, anthropomorphizing the insect and emphasizing its connection to the Tlaxcalan breeder.[55] Another writer to demonstrate these tendencies was Gonzalo de las Casas (1520?-1593?), a silkworm breeder from the Mixteca region (now Oaxaca), and the author of a manual on silkworm breeding.[56] The son of a conquistador, De las Casas inherited an *encomienda* and trained its residents in sericulture or silkworm cultivation and silk production (Santa María 68; De las Casas and Garrido Aranda xviii-xxiii).[57] De las Casas's text linked Muñoz Camargo's work to a broader corpus of treatises that viewed the mechanical arts as a way to acculturate indigenous populations into Spanish colonial society.[58] In the prologue to *Arte para criar seda en la Nueva España* (1581), De las Casas declared that he wrote the manual to "benefit" and "please" the "Indians of New Spain" (f.4, f.4v). Believing that he had a moral obligation to disseminate techniques of silk cultivation, De las Casas encouraged breeders to be both diligent and empathetic in caring for the silkworm.[59]

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[55] As the Introduction mentioned, Laguna explained that natural elements should be viewed through a philosophical framework that saw nature as an instrument for influencing human and political behavior.

[56] Alberto Carrillo Cázares has cast doubt as to whether Gonzalo de las Casas did in fact write *Arte para criar seda* (70).

[57] Charles Gibson has defined *encomienda* as a "system of private labor and tribute jurisdiction" that was assigned to a Spanish holder (*Aztecs* 26).

[58] In his biography of Archbishop Zumárraga, García Icazbalceta noted that he ordered the clerk of the Oaxaca Cathedral, who was also a well-known botanist, to "create a text by which Indians could be instructed in the breeding of silk until it is dyed. And the precentor (*chantre)* fulfilled his duty. This book . . . has not reached us [nineteenth-century readers]; but years later Gonzalo de las Casas filled the need with his *Arte para criar seda en la Nueva España*, printed in 1581" (García 237-38).

[59] Although, in writing, De las Casas portrayed indigenous silkworm breeders and threaders as valuable and highly skilled, he was apparently not always consistent in his regard for these

De las Casas heightened empathy for the silkworm by his personification of the insect. He believed that the worms possessed five senses (f.24), experienced the seven stages of human life (f.41), and felt emotions (f.40v). He wrote: "it is believed that they feel pain, because they fear, and accordingly they also fall in love because they come together and are joyous to be together and seek each other. . . . This will be worthwhile to know so that they are well treated and not harmed . . . so that they are not given pain or grief" (De las Casas f.40). To De las Casas, proper care of the silkworm required recognition of these human qualities.

De las Casas was not the only writer to anthropomorphize the silkworm. Sebastian de Covarrubias, author of the first vernacular Spanish dictionary, *Tesoro de la lengua* (1611), also did. In his entry for "worm," Covarrubias stated that silkworms "bring us such wealth and elegance, bringing forth from their entrails their silk cocoon, creating their own sepulcher, for that is where they remain enclosed and die" (f.458v). Covarrubias's humanlike insect built its cocoon as his final resting place. Further, presenting the death of the insect as a natural and self-driven process may have helped justify killing the worm for the sake of a commodity.

Writers similarly personified the cochineal insect. As early as 1550, Laguna described cochineal cocoons as "bodies without souls" (42; vol. 2). And Muñoz Camargo described the birth of the cochineal insect in very human terms: "This worm grows in the same leaf of the *tuna* the moment the mother, who expels a million young (*hijuelos)* that are as small as mites (*aradores)*, bursts" (*Historia* 288). Muñoz Camargo then further described how the offspring sought nourishment, grew sick, and feared predators. Muñoz Camargo's choice of the word *arador* for the offspring is also significant; Covarrubias defined *arador* as both a wormlike mite

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workers. When he took over his father's *encomienda* in 1550, the viceroyalty charged him with and punished him for tributary abuses against the residents of the *encomienda* of Yautitlan (De las Casas and Garrido xix). And years later, in the prologue to the *Arte*, De las Casas characterized silkworm cultivation as "menial work" (f.4v.)

and a plowman (f.82).[60] In anthropomorphizing *nocheztli*, Muñoz Camargo cast the Tlaxcalan cultivators as attentive guardians of these helpless beings:

Figure 4. Nahua Cultivation of *nochiztli* and use of its pigment, in Bernardino de Sahagún, *General History of the Things of the New Spain by Fray Bernardino de Sahagún: The Florentine Codex*. World Digital Library. Web. 20 Mar. 2015. http://www.wdl.org/en/item/10622/view/1/1/.

> The cochineal by nature seeks shelter, so that the air, water, and hail do not cause offence and in turn latches and places itself under the leaf of the *tuna*. And as the tree grows, the natives curve the leaves, tilting them in the direction where they might find shelter, in a way that the cochineal can always find reprieve (*reparo)* and protection. (*Historia* 290)

Tlaxcalan breeders were thus nurturers, guides, and protectors of the personified cochineal.

As we will see in Chapter 2, Nahua historians believed that there was a profound connection between governance, conservation of natural products, and the welfare of an *altepetl* or city-state. This belief, and its difference from Spanish approaches to the natural world, is apparent in Fr. Bernardino de Sahagún's description of the cultivation of *nocheztli*. Sahagún wrote his exhaustive account of Nahua history in collaboration with Nahua scholars, and the

[60] Muñoz Camargo and Antonio Herrera were the only writers to use *aradores* to refer to young cochineal, a coincidence that further supports the theory, discussed above, that Herrera had access to Muñoz Camargo's writings.

section on *nocheztli* thoroughly recorded ancient Nahua history, practices, and language.[61] This description, which appears to be the only other Nahua version of Native American engagement with *nocheztli*, deployed multiple media and was open to a number of interpretations. A portion of the text was in Nahuatl, and a portion was in Spanish, but the content of the two varied in telling ways. Sahagún focused his description in Nahuatl and pictures on the life cycle of the cochineal insect:

> "First paragraph which telleth how all the colors are made" . . . The cochineal *nopal* is the breeding place of this cochineal. It lives, it hatches on the *nopal* like a little fly, a little insect. Then it grows; then it develops; then it increases in size. It fattens, it increases much in size, it thickens, it becomes round. Then it envelops itself in fat. When the worms are distended, they come to rest just like blood blisters. Then they cover themselves with a web. Then they die; they fall; also they are heaped together, swept up. (*Florentine* 239; bk.11, par.1)

The first drawing shows the cochineal worm in its natural state, resting while attached to the *nopal*. The second depicts Nahua engagement with the insect, as a breeder sweeps up the worms that have fallen to the ground (Fig. 3). The written account in Nahuatl complemented the drawings. It first explained the life cycle of the worm in detail, and then it described the actions of the Nahua in producing its dyestuff. Sahagún's Nahua sources noted that the dyestuff producers allowed the insect to complete its life cycle, only sweeping up insects that had died naturally; the pictorial account corroborated this assertion (*Florentine* 239; bk.11, par.1).[62]

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[61] For more on Sahagún's process for collecting information on ancient Nahuas, see Alfredo López Austin.

[62] As we will see in Chapters 2 and 3, the Nahua applied this same principle to timber production, using only dead or naturally felled trees rather than cutting live ones (Sahagún, *General* f.109v.).

The Spanish text that accompanied the Nahuatl described different aspects of cochineal production:

> "The first paragraph deals with the [cochineal] graine and other fine colors" . . . Those [cochineal] worms have very red blood, that is the fine cochineal. This graine is well known in this land and outside of it, and its commerce reaches as far as China and as far as Turkey. It is valued and considered in high regard almost all around the world. (Sahagún, *General* f.216v)

In the Spanish narrative, Sahagún described *nocheztli* as a renowned and profitable commodity but did not mention its development process. The insect, which had effectively inserted itself within a global commercial market, could now further royal interests. The differences in the Spanish and Nahuatl texts alert the reader to significant differences between Spanish and Nahua approaches to the insect. Spanish officials prioritized the breeding and killing of the insect to maximize the commercialization of the dye, while Sahagún explained the dye production was a logical progression once the worm concluded its lifecycle.

Sahagún's description of the dye-making process invites comparison with other accounts of the same. Unfortunately, however, Muñoz Camargo did not address the production process, describing only the numerous moments the Tlaxcalan breeders intervened in the *nocheztli'*s life cycle to ensure germination and maturation. The pictorial manuscript attached to Gómez de Cervantes's text, which, as mentioned above, was likely commissioned or illustrated by Muñoz Camargo, depicted only the process for regenerating the cochineal insect and *nopal* (Figs. 1 and 2). As a result, the only other sources to directly address the killing of the cochineal insect were Gómez de Cervantes's report and Viceroy Velasco's 1592 cochineal regulations. Comparing

these sources to Sahagún's account, it appears that a shift had occurred in Tlaxcalan dyestuff production processes.

Instead of allowing the worm to die naturally, the Tlaxcalan began to cut its life short, in an apparent response to the transatlantic demand for cochineal. Gómez de Cervantes noted that "indians" killed the cochineal insect to turn it into vermillion dye, and his experiment tested five methods for killing doing so (Gómez 174-76). In the most common method, the *nocheztli* were placed on a reed mat in the sun, where they dried out (Gómez 174). A second method involved placing live cochineal on a reed mat so that "indian women" could apply pressure to them with their hands (Gómez 175). Two methods made use of boiling water, with dye makers either placing the live cochineal directly into the boiling water, or steaming the worms in a bag hung over it (Gómez 175). And in the last method, *nocheztli* were placed into a jug that was then vigorously shaken (Gómez 176). Informed by the results of this experiment, the cochineal regulations of 1592 did not designate any preferred method: "by this same ordinance it is left to the judgment of the breeders to bring death to the cochineal as they please" (Alzate, "Memoria" 297).

A comparison of these accounts reveals a critical discrepancy. Unlike Gómez de Cervantes, who described ways to kill cochineal, Muñoz Camargo wrote about keeping the insect alive, highlighting Tlaxcalan attempts to perfect its regeneration. The contrast suggests that the Tlaxcalan modified their cultivation and manufacture processes to keep up with demand for its dyestuff.

In addition to their empathy for their insects, both De las Casas and Muñoz Camargo focused on the transferability of the products and practices around them. To De las Casas, the dissemination of knowledge was essential to the development of sericulture in colonial society.

He likened the principle of the transferability of knowledge to a fundamental moral tenant:

> by which talent one can come to understand the graces that God has bestowed upon men so that they communicate them among men and he who with [that knowledge] gains or achieves greater good, to him benefit and grace will duplicate, and he who does not practice or engage in this will not only lose the grace he possesses, but he will be threatened with a sentence in hell. . . . Therefore, those who have found to have gained profitable experience in the breeding of silk must reveal it to his fellow man. (f.7)

The spread of sericulture had concrete economic repercussions. As indigenous silk breeders sold threaded silk inexpensively, Spanish producers had to lower their prices.[63] And as Zumárraga had foreshadowed, sericulture would be an important strategy for acculturating indigenous populations.

Muñoz Camargo also urged expanding cochineal production. He proposed building a large *nopal* plantation in the northern region of Mexico occupied by the Guachichilean, a Chichimec nomadic population. He called this plantation *Tunal Grande*:

> along the diameter of that entire *nopalrie* [*Tunal grande*], there are streams that go through it in many parts according to the Spaniards that have set foot and crossed it. . . . And according to what I have seen in some parts where there is both fine and wild cochineal that if it were reared, it would be as good as that which is cultivated. Though this has not been experimented. (Muñoz, *Historia* 288)

[63] As I mentioned in the Introduction, Motolinía proposed similar applications of market theory to other industries.

Although it is uncertain when Muñoz Camargo wrote this segment of the *Historia*, Herrera curiously included similar information in his *Décadas.* Herrera also mentioned that, in the region near Guadalajara and Zacatecas, "there are many *tuna* trees, of admirably good fruit, with great amounts of fine cochineal, though it has not been experimented with yet, and from the fruit, most of the year, the Chichimec and Guachichilean indians find their nourishment" (195). That Muñoz Camargo and Herrera are the only writers to associate *Tunal Grande* with cochineal production is further support for the theory that Muñoz Camargo had authored the anonymous manual that Herrera was said to possess.

Strategies to settle Chichimec regions were nothing new. Past military attempts to conquer the Guachichileans had failed, at significant cost to the monarchy. And Spanish authorities had attempted to pacify the Chichimec through voluntary Tlaxcalan relocation in the 1560s. This, too, had failed. It was therefore almost certainly not a coincidence that these writers proposed placing the new center of cochineal production in territory occupied by the Guachichilean and Chichimec peoples. Although Muñoz Camargo did not propose anyone in particular to lead construction of *Tunal Grande*, other documents show that Muñoz Camargo himself, along with royal, Tlaxcalan, and Franciscan authorities, was a key figure in the negotiations and administration of a project to insert seminomadic Chichimec peoples into the settled life of the colonies through the relocation of four hundred Tlaxcalan families to the region. In 1590, the Tlaxcalan Indian government, Viceroy Luis de Velasco, and representatives of the four hundred families entered into negotiations. With the crucial assistance of three mediators—Muñoz Camargo; Fr. Gerónimo de Mendieta, Guardian of the Convent of Tlaxcala; and Fr. Gerónimo de Zárate, the Franciscan chaplain of San Juan de los Naturales in Mexico City—the

cabildo produced an agreement (Lockhart 7).[64] The agreement called for four hundred Tlaxcalan families to relocate and lead the colonization of the Guachichilean-occupied region in 1591. Evidence suggests that on November 2, 1591, none less than Muñoz Camargo founded the Tlaxcalan town of San Miguel Mesquitic, the site of *Tunal grande* (Velazquez 219-22; vol. 1 qtd. in A. Martínez, "Colonizaciones" 226; Gibson, "Identity" 204; and Frye 115).[65] Both *Tunal Grande* and Muñoz Camargo were therefore apparently at the center of Tlaxcalan acculturation of Guachichilean people.[66]

While we can only speculate as to Muñoz Camargo's direct involvement in the cochineal production that occurred at *Tunal Grande*, there is evidence that vermillion dyestuff was produced in the region prior to 1592. The 1592 ordinances that regulated cochineal production prohibited trade of a cochineal grain named *salnochistle* from the Chichimec region (Alzate,

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[64] Muñoz Camargo and Mendieta had previously worked together to mediate development of *congregaciones*, or social regroupings of indigenous populations, in order to restructure Tlaxcalan communities to facilitate the workings of a centralized indigenous government (A. Martínez, *Gobierno* 245).

[65] Mesquitic was located in the present-day state of San Luis Potosí, Mexico. A later decree, dated June 18, 1592, reiterated and confirmed that the town was established by Diego Muñoz Camargo and friars of the Franciscan order (AGN, *Indios*, vol. 6, exp. 36). Scholars still cannot determine whether it was our Muñoz Camargo who set out to pacify the Guachichilean or his son, also named Diego Muñoz Camargo (Reyes García 17). Perhaps the argument that I advance in this chapter that Diego Muñoz Camargo the elder advocated the colonization of *Tunal Grande* can add to the compelling evidence that he, not his son, founded the town.

[66] Pacification of the Chichimec region was an ongoing priority for the Spanish crown, which had already poured significant economic resources into a failed military campaign to appease the "barbarous*"* people. In 1585, Bishop Domingo de Alzola urged the viceroyalty to end the war against the Great Chichimec region:

> And that these Mexican or Tlaxcalan indians that are well learned, can serve as political officers and ministers in Churches and can help the population. And in this way with the delicate teachings of the missionaries and the communication of the Christian Indians, it would be impossible for those barbarians not to be reduced to peace and friendship with us and our Catholic faith. (qtd. in A. Martínez, *Gobierno* 278)

Tlaxcalan colonization represented an alternative form of conquest, more in line with natural law and philosophy. As Laguna stressed in the preambles to "Dioscorides," military art could not be further from God's design (21; vol.1).

"Memoria" 298). At least in its early years, cochineal cultivation must have been an established practice in Mesquitic.

There is also evidence that viceregal authorities directed the Tlaxcalan colonizers to use Tlaxcalan material culture to encourage a settled lifestyle. As the four hundred Tlaxcalan families departed, Viceroy Velasco gave them a number of objects to take with them. These objects included Tlaxcalan cultural material such as seeds, shrubs, household items, traditional attire, and painting supplies, as well as one thousand Castilian sewing needles (A. Martínez, *Gobierno* 294-96). Colonial authorities thus recognized the importance of agriculture and the mechanical arts to the social reconfiguration of Nahua peoples under Spanish rule.[67] Interestingly, the viceroy did not require the replication of Castilian social and material practices, but rather provided materials to facilitate the transfer of autochthonous mechanical arts, forms of dress, and songs and dances, encouraging the reproduction of current Tlaxcalan identity (A. Martínez, *Gobierno* 296).

Another critical factor in shaping and replicating Tlaxcalan identity was the significant political concessions that Spanish authorities granted the Tlaxcalan colonizers (A. Martínez, "Colonizaciones" 231). The prior attempt to voluntarily relocate the Tlaxcalan in the 1560s had failed in part because royal authorities had refused to acknowledge the validity of objections

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[67] Fr. Gerónimo de Mendieta (1525–1604), a Franciscan missionary and historian that resided in Mexico, described the contribution of the four hundred colonizers in his *Historia ecleciástica Indiana* (1596):

> And this great endeavor owes itself to the Indians of the province of Tlaxcala . . . because they granted viceroy Luis de Velasco Jr. four hundred residents in order to settle among the Chichimecan that came in peace so that with their communication and commerce they would be placed under civil law (*policía)* and Christian practices. (Bk. 5, pt. 2 in A. Martínez, *Gobierno* 303)

Though Franciscan friars accompanied the colonizers to assist in the process of evangelizing the Chichimec, Mendieta made clear that the Tlaxcalan were primarily responsible for the successful incorporation of the nomadic group into a colonial social mold.

raised by the would-be colonizers (A. Martínez, "Colonizaciones" 201-03).[68] Thirty years later, in an attempt to ensure that the four hundred Tlaxcalan families would in fact relocate, Spanish authorities gave in to significant demands from Tlaxcalan mediators. A provision dated March 9, 1591 stipulated that:

> The 400 Indian friends have houses, lands, and possessions and they will leave their beneficiaries, people that they choose, and they have requested that I decree to protect them so that in their absence or at any other time none of what they have left is taken from them. For that reason and aware that it would be unfair to risk the loss of their possessions in order to go and serve his Majesty, by this decree, I order they be protected. (AGN, *Indios*, vol. 5, exp. 270, f.142)

Those emigrating were assured continued possession of their lands and belongings, and were free of any requirement of tribute to the Crown or personal services to others. They were further permitted to carry a sword and ride a saddled horse (AGN, *Tierras*, vol. 2956, exp. 99, f.198v, f.199). Another concession established the boundaries between Tlaxcalan and Spanish or Chichimecan settlements (AGN, *Tierras* vol. 2956, exp. 99, f. 199). These decrees permitted relocated Tlaxcalan populations to retain both their possessions and the political standing they had negotiated as an independently governed entity under Spanish rule.

The legislation that defined the boundaries between Tlaxcalan, Chichimec, and Spanish settlements makes it difficult for scholars to agree whether to deem the colonization process a success (Frye 122; A. Martínez, "Colonizaciones" 233). These laws, which sought to separate the Chichimec and Tlaxcalan populations, would have also prohibited the day-to-day interactions

[68] In the 1560s, only Tlaxcalan men were asked to relocate, and they objected to the plan on the grounds that it would take them too far from their families. In the 1590s, however, entire families relocated. Nonetheless, the willingness of Spanish authorities to concede other Tlaxcalan demands is evidence of their desire for the project to succeed.

that the colonization project required. The evidence, however, suggests that these interactions did in fact take place. Records show that the Guachichilean population had been decimated by 1670s, while the Tlaxcalan group experienced staggering growth, increasing from eighty to five hundred families over some eighty years (A. Martinez, "Colonizaciones" 235). One plausible conclusion supported by these dramatic changes in population is that the Guachichilean simply recognized the political and economic advantages of joining the Tlaxcalan settlement (A. Martínez, "Colonizaciones" 231-35).

This growth in the Tlaxcalan population, like that of cochineal cultivation, was foreshadowed in Muñoz Camargo's narrative. There is a parallel between his proposal to expand the cultivation of his personified cochineal insect and his urging that the Tlaxcalan participate in settling the Chichimec nomadic groups and simultaneously regenerate their own Tlaxcalan culture. His appendix suggests that Muñoz Camargo saw the northern migration as an opportunity to expand both cochineal production and the concept and significance of Tlaxcalan identity.

As opposed to accounts that described the extraction and killing of the cochineal insect, Muñoz Camargo wrote about its cultivation process and the breeders that kept the insect alive and well-nurtured. Muñoz Camargo portrayed the Tlaxcalan as an increasingly influential agent of change in a context of decline in the cochineal trade and sociopolitical unrest of Chichimec nomadic peoples. According to natural philosophy, sociopolitical inferences could be drawn from nature's beings. Through the cochineal insect, Muñoz Camargo offered an alternative conception of the colonial world. Autochthonous natural products, practices, and sociopolitical restructuring could allow indigenous populations to protect their welfare under Spanish rule.

Muñoz Camargo also wrote about how, during their initial pilgrimage to settle

Tenochtitlan, the Nahua saw a *nopal* miraculously growing among rocks and "interpreted this occurrence as a prophesy that Mexican population was to be eternal and unchanging, since the fruit trees rooted themselves in dry rocks, and so with greater reason, men would have to root themselves and remain there forever" (*Historia* 228). Significantly, this *nopal* is the same tree that nurtured the cochineal insect: "it breeds with the substance that the *nopalli* leaf brings it, and it does not eat anything else" (Muñoz, *Historia* 287). This connection highlights the philosophical component of the study of natural elements. In this light, and through cochineal cultivation and the vermillion dyestuff trade, the Tlaxcalan were cast as nurturers and their natural knowledge and practices were authorized. Muñoz Camargo's appendix and the concurrent relocation of four hundred Tlaxcalan families demonstrated the critical contributions of Tlaxcalan people to economic and sociopolitical enterprises within the parameters of the Spanish project of colonization.

Chapter 2. Nahua Attitudes towards Nature and Colonization

> Cultural attitudes toward nature set the tone of the human relationship with the environment and can potentially be a most significant factor in a culture's sustainability. Ideas often matter. In practice, however, attitudes towards nature have yet to prove themselves historically significant. (Miller 4)

In the sixteenth century, European scholars and political authorities recognized God's will in natural behaviors. Adopting this view, Andrés Laguna (1499-1559), a physician for the Spanish court, believed that plants, by divine design, "provide[d] a clear example of equity and justice, for we see that every one of them remains in its own post (*asiento)* where it was planted without usurping or invading the space of its neighbors" (Paratext). At a time when Spanish exploitation of nature and appropriation of American land appeared unchecked, Laguna turned to natural philosophy to suggest that rulers should imitate the behavior of plants and respect established territorial boundaries. There is, however, no evidence that Spanish authorities followed Laguna's directive. As I will explain in Chapter 3, colonial forestry regulations testify to Spanish authorities' continued disregard for both the survival of natural resources and local territorial borders. Nahua historians in central Mexico admonished Spanish colonial authorities, drawing a contrast between their behavior and local populations' traditional engagement with and respect for their natural environment. Indigenous attitudes towards nature, which would play a critical role in the survival of those local communities, directly influenced the development of successful strategies that the Nahua used to govern other Nahua groups. Some cases, like the Tlaxcalan approach to the cochineal insect we saw in Chapter 1 and the Chalca approach to timber described below, suggest that colonial authorities integrated aspects of a Nahua

philosophy of governance based on sustainability, and that this integration resulted in concrete and historically significant actions that improved the living conditions of Nahua populations under Spanish rule.

In this chapter, I analyze accounts by three Nahua historians: Diego Muñoz Camargo (1529-99), a Tlaxcalan historian, entrepreneur, and liaison between the Spanish crown and Tlaxcalan Indian government; Domingo Francisco de San Antón Muñón Chimalpahin Quauhtlehuanitzin (1579-1660), a Chalca historian and high-ranking administrator of the Church of San Antón in Mexico City; and Fernando de Alva Ixtlilxochitl (1568?-1648), a Texcocan historian and the governor of Texcoco and Tlalmanalco. I view these writings as deliberate responses to the blatant exploitation of timber and woodworkers in central Mexico in the late sixteenth and early seventeenth centuries. Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl simultaneously reconceptualized the past and condemned Spanish entities for their exploitation and appropriation of Nahua resources and labor. They also documented traditional Nahua forestry regulations and management, and distinguished between Nahua and Spanish uses of nature. All three writers suggested that successful Nahua rulers had been guided by a belief in an indissoluble connection between benevolent governance, nature, and labor, which led them to efficiently and humanely manage timber and the specialized craftsmen who worked with it. These craftsmen, known as *hacheros*, were highly skilled indigenous loggers who could differentiate between species of trees, cut down timber, and finish the wood into boards, planks, canoes, and other products. Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl also argued that to survive and prosper, the various Nahua *altepetl*, or city-states or communities, needed to be permitted to manage their natural resources and skilled labor autonomously. This position

contrasted with the Spanish model of colonization that each Nahua historian criticized as unable to protect or sustain the Nahua people.

Nahua Histories as Critical Assessments of Spanish Colonization

As I discussed in Chapter 1, to Muñoz Camargo, historical accounts written in the colonial period were tools for the preservation and promotion of the Tlaxcalan past under Spanish governance. Subsequent drafts of his *History of Tlaxcala* (1592?) suggest that he modified its content in response to changing audiences and to influence the status of the Tlaxcalan under Spanish rule. Alva Ixtlilxochitl and Chimalpahin also recorded traditional Nahua sociopolitical practices, and used them as a reference point for condemning and influencing the social conditions of the day.

Although Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl compiled and transcribed ancient testimonies from original Nahua pictorial and oral records, these historians do not represent an ancient Nahua perspective. Inherent in their retelling of the past is a critical commentary on a Spanish system of governance that did not sufficiently value the welfare of Nahua communities. Nahua historians often portrayed their people as noble, a strategy for achieving recognition and perhaps even political concessions from Spanish rulers, and Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl were no exception. However, although they praised their respective Tlaxcalan, Texcocan, and Chalca populations, these three historians also fostered a collective Nahua perspective.[69] In particular, their historical accounts suggest a shared

[69] During the colonial period, the Nahua occupied the central region of present-day Mexico, and comprised its largest "cultural-linguistic group" (McDonough 5). The Nahua group was itself comprised of a number of smaller *altepetls*, or city-kingdoms. Prior to the arrival of the Spanish, the Mexica, commonly known as Aztecs, established themselves in the city of Tenochtitlan as the dominant *altepetl*. Texcoco, another dominant *altepetl*, subordinate to but allied with Tenochtitlan, helped the Mexica expand their rule through military and political subjection. One of many groups conquered by the Mexica-Texcoco alliance were the Chalca. As we will see

vision of the natural world that was incompatible with Spanish timber exploitation. Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl promoted traditional Nahua forms of governance and highly successful political strategies that allowed vanquished *altepetls*, or city-kingdoms, to retain their land and natural resources to protect those communities and conserving their resources.

Muñoz Camargo and Nahua Strategies to Curtail Deforestation

A liaison between the autonomous Indian government of Tlaxcala and the Spanish crown, Muñoz Camargo acted in allegiance to his indigenous and European ancestors. As we saw in Chapter 1, in his role as interpreter and ambassador for the *alcalde mayor* of Tlaxcala (Muñoz 16-17), he facilitated the migration of four hundred Tlaxcalan families to further the Spanish colonization of nomadic Chichimeca groups (A. Martínez, *Gobierno* 303). In addition to this prominent role in Tlaxcalan politics, Muñoz Camargo also pursued economic ventures that included trade in slaves, land, and various natural and animal products, commercial interests that undoubtedly influenced his political positions (Muñoz 23).

On behalf of the Indian government of Tlaxcala, Muñoz Camargo responded to the "Instrucción y memoria" (1577), a royal questionnaire that requested detailed information about the flora, fauna, geography, and local social practices of all political enclaves under Spanish rule.[70] Spanish authorities used this information in developing administrative systems to govern

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throughout this chapter, after their conquest by the Mexica and Texcocans, the Chalca were required to pay tribute consisting of timber and skilled labor to the dominant *altepetls*. The Tlaxcalan resisted Mexica attempts to conquer them through the arrival of the Spanish conquerors. As mentioned in Chapter 1, Spanish and Tlaxcalan powers became allied, and this alliance helped Hernán Cortés defeat the Mexica.

[70] Responses to the "Instrucción y memoria de las relaciones que se han de hacer para la descripción de las indias, que su majestad manda hacer para el buen gobierno y ennoblecimiento de ellas" formed a corpus of detailed local histories commonly referred to as *Relaciones geográficas.*

the new territories. In his response, Muñoz Camargo included detailed descriptions of natural products and their respective Nahua and Spanish uses. In particular, he suggested that the cochineal insect and the skilled indigenous workers who cultivated it could constitute the basis of a viable industry, in which traditional Tlaxcalan technical knowledge, specialized labor practices, and regeneration strategies would give rise to highly lucrative transatlantic commerce that would benefit all sectors of colonial society. Muñoz Camargo also praised Nahua use of wood and its byproducts, noting the advantages of different resources and Nahua sociopolitical strategies for preventing their exploitation, such as legal measures that successfully curtailed illegal cutting and regenerated valuable woodlands (276).

According to Muñoz Camargo, the Nahua never sacrificed a whole tree in order to obtain fruit, resin, flowers, or bark. As an example, he described Nahua methods for harvesting rubber from *ulquahuitl*, or the Panama rubber tree: after stabbing the tree with an ax, they allowed the milk to run freely, collecting it for transport in containers or by spreading it all over their bodies until it hardened. Next, they melted the sap and shaped it into rubber balls and chest guards that could deflect arrows. The oils that were a byproduct of this process were used medicinally, to contain hemorrhages (282-83).[71] Muñoz Camargo boasted that the Nahua did all this while conserving the tree, and he criticized the Spaniards for their inability to trust and accurately imitate Nahua techniques, which rendered them unable to successfully harvest these products without sacrificing the whole specimen (276). This description of *ulquahuitl* underscores the tension between Spanish and Nahua views and uses of natural resources.

[71] As I will show in the Conclusion, the *ulquahuitl* tree, by then known as *castilla elástica*, would figure prominently in eighteenth-century debates over the development of colonial industries for the mutual benefit of indigenous communities and Spanish economic interests.

Following his description of *ulquahuitl*, Muñoz Camargo condemned the recent deforestation of the Napatecuhtli Mountains.[72] Alluding to the differences between Nahua and Spanish sociopolitical forestry practices, Muñoz Camargo chastised Spanish entrepreneurs for decimating these heavily wooded forests for the sole purpose of collecting pine nuts. He added that such exploitation "ha[d] been remedied by those who have governed this land" (Muñoz 276), a reference to direct intervention by the Tlaxcalan Indian government.[73] It is worth recalling that following the military defeat of Tenochtitlan and subsequent conquest of the Mexica in 1521, the Spanish crown granted their Tlaxcalan allies the privilege of a largely autonomous government.[74] It is therefore unlikely that Spanish directives superseded Tlaxcalan local legislation in the areas that remained under Tlaxcalan control, especially since it is well-documented that viceregal forestry legislation from 1579, 1605, and 1614 repeatedly failed to safeguard central Mexican woodlands that fell outside of Tlaxcalan jurisdiction (Zavala, *Ordenanzas* 75-80). To Muñoz Camargo, the successful conservation and regeneration of resources in the Napatecuhtli range was a result of autonomous Nahua governance. Implicit in his praise of Tlaxcalan administration of natural resources was criticism of Spanish policies.

Chimalpahin and Viceregal Timber Exploitation

[72] This mountain range defined the eastern boundary of the Tlaxcala region. The Iztaccihuatl and Popocatepetl mountains separated Tlaxcala from Chalco to the west. As we will see in Chapter 3, the western foothills of the Iztaccihuatl Mountains provided Mexico City with timber, a bounty that made it attractive to the Jesuits who tried to appropriate the region.

[73] In a future project, I will reconstruct and analyze the circumstances surrounding the exploitation of the Napatecuhtli Mountains and the legislation directed at its conservation.

[74] In 1537, King Charles V proclaimed the Tlaxcalan, these "rulers of forests and waters," his "cousins" (A. Martínez, *Gobierno* 75). The Tlaxcalan never considered themselves subordinate to the Spanish conquerors, but rather equal nobles (A. Martínez, *Gobierno* 73). Among other concessions, the Tlaxcalan could govern their own territory and resources, could carry weapons, were not subject to ecclesiastical authority, did not have to pay tribute, and were not vulnerable to loss of territory through land grants or *encomiendas* (A. Martínez, *Gobierno* 73-80).

Like Muñoz Camargo, who used his narration of history to emphasize Tlaxcalan contributions to colonial society, Chimalpahin reconceptualized past and current events in an effort to benefit the Nahua under Spanish rule. A Nahua historian and migrant to Mexico City from the Amecameca region of Chalco, Chimalpahin descended from distant noble lines of a traditionally subjected *altepetl* and wrote in Nahuatl to a predominantly Nahua audience. He therefore offered a different perspective than other Nahua historians. Little is known about Chimalpahin. He held a high-ranking administrative position at the Church of San Anton, a role that scholars believe entailed significant interaction with prominent figures, and yet he does not appear in the histories of his contemporaries, such as Alva Ixtlilxochitl (Schroeder 15).[75] As we will see, although Chimalpahin praised the Chalca people, especially those from Amecameca, his narrative blurred the differences and rivalries between Nahua groups. Like Muñoz Camargo, Chimalpahin contrasted Spanish and Nahua roles in the exploitation of central Mexico's forests, their sociopolitical uses of natural products, and their colonization strategies. According to Chimalpahin, the Chalca provided the Mexica *altepetl* with the majority of their timber, and were advocates for the *hacheros*, woodland conservation, and ultimately entire Nahua communities.

As mentioned above, much of the forestry legislation enacted during the early Spanish colonial period was unsuccessful (Zavala, *Ordenanzas* 75-80). In one example, Chimalpahin wrote that in 1615 Viceroy Diego Fernández de Córdoba (1578-1630) authorized Spanish entrepreneurs to clear all trees from the forests of Chapultepec in a misguided search for gold.

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[75] Although it is possible that Chimalpahin was one of the Nahua intellectuals to attend the Colegio de Tlalmanalco, the Colegio was already in decline when he arrived in Mexico City at the age of fourteen, and he therefore most likely began working for the Church of San Antón as soon as he arrived (Schroeder 13-15). Similarly, it was an earlier generation that had responded to the Crown's 1577 "Instrucción y memoria" questionnaires. In contrast to these questionnaires and other sixteenth-century works, Chimalpahin's writing did not contribute to a collective historical project, nor was it limited to a prescribed form and content (Solano 79-81).

Chapultepec, a prominent Nahua foothill located in the mid-western bank of Lake Texcoco, slightly west of Tenochtitlan, had a long and important history. The ancient Mexica first settled there on their pilgrimage to found Tenochtitlan, and it was the site of important battles that secured their military hegemony.[76] This strategic importance was further bolstered by the fact that Chapultepec provided natural resources that sustained Nahua populations (Marroqui and Obregón 222). Even before the arrival of the Spaniards, Nezahualcoyotl, the ruler of the Texcocan and an ally of the Mexica, engineered an aqueduct to transport potable water from Chapultepec to Tenochtitlan (Alva 201).[77] This act of practical diplomacy ensured harmonious relations between Texcoco and Tenochtitlan at the same time that it gave the Mexica control over natural resources and therefore additional political power over other inhabitants of the region (Alva 152). Spanish authorities, too, understood the importance of Chapultepec and its natural resources when they destroyed the aqueducts, denying the Nahua an essential resource and helping the Spaniards defeat the Mexica (Alva 437).[78]

Spanish lawmakers made Chapultepec the object of numerous—and sometimes conflicting—regulations. In July of 1529, the Spanish monarchy gave Chapultepec, "with its

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[76] For more on Chapultepec's traditional or mythical significance, see Miguel León Portilla and Eduardo Matos Moctezuma. Susan Toby Evans has described Chapultepec and the foothills of Tetzcotzinco as anthropogenic forests developed by political allies, as well as the object of a rivalry between the Mexica and Texcocans.

[77] The Texcocans and Mexica were also linked by family ties. The ruler of the Mexica at the time was Nezahualcoyotl's uncle.

[78] Francisco López de Gómara, a Spanish historian who compiled an account of the conquest of Mexico from Hernán Cortés's testimony, explained that Chapultepec's springs provided potable water to the rest of Mexico (Chimalpahin, *Chimalpahin's* 202-03). He noted that the Mexica controlled access to the resource, imposing taxes on the sale of water (Chimalpahin, *Chimalpahin's* 203). López de Gómara also described Cortés's strategy to cut off this water source, and hardship it caused the Nahua (Chimalpahin, *Chimalpahin's* 310-11). Bernal Díaz del Castillo (1492?-1584), a soldier who fought alongside Cortés and wrote an eyewitness account of the military defeat of Tenochtitlan, confirmed that the Spaniards clearly understood that Chapultepec was the source of water for the Mexican *altepetl*, deliberately destroying the aqueduct to assure a Spanish victory (Matos Moctezuma 276).

foothills, valleys, and grasslands, and waters, those still and flowing," to Hernán Cortés as a reward for the victory in Tenochtitlan (Marroqui and Obregón 222). One year later, in June 1530, however, the Crown took back "the foothill where the spring of drinking water emanates, along with its surrounding lands and trees" (Marroqui and Obregón 222), and gave it to the *cabildo* or governing body of Mexico City. Soon after, on September 6, 1532, Spanish authorities enacted one of the first laws to prohibit the cutting of trees in Chapultepec (Bejarano191; vol. 2). A subsequent law, promulgated on December 12, 1533, required the *cabildo* to increase surveillance of the forests to prevent illegal cutting of trees and theft of water in Chapultepec, an apparent response to the failure to enforce the 1532 law (Orozco 65; vol. 3). Decrees dated July 21, 1550, appeared to soften the prohibition on cutting, as Spanish authorities began to grant licenses for the extraction of timber (Bejarano 301; vol. 5, pt. 1). From that point forward, for every piece of legislation that limited or prohibited the cutting or extraction of wood, a license or land grant rendered it ineffective.

Although Chimalpahin's account omitted the fact that these lands had been the object of legal protections, he did not hold back in describing the deforestation that resulted from the viceroy's actions: "they knocked down all the cypresses that were there and left them scattered around; they cut them up and split them and they were brought here to the palace, where they were burnt in the kitchen; with that things were left very bare in Chapoltepec. . . . Chapoltepec used to be a very marvelous place" (*Annals* 303). This vivid description of the destruction of Chapultepec was a disquieting allegory for the devastating effects of timber exploitation on Nahua communities: first the scattering, then the splitting, and, finally, the incineration or total destruction. Chimalpahin, in blaming the viceroy, criticized Spanish authorities for the destruction of a sacred Nahua space. Still, given that Chimalpahin's primary allegiance was to

the Chalca, who had been militarily conquered by the Mexica, it seems likely that Chimalpahin objected more to the authorized squandering of woodlands and timber than to the loss of a source of Mexica power.

The context of Chimalpahin's critique makes it even more poignant. At the same time that licensees were clearing cypresses or *ahuehuetl* in Chapultepec, the Chalca were required to provide timber from their forests for a massive viceregal project to drain all the lakes of the valley. And, as we will see in Chapter 3, they were also prosecuting a lawsuit against the Jesuits to challenge the viceroy's gift of these forests and their timber resources to the Society of Jesus. To Chimalpahin, deforestation meant indigenous depopulation, a tragedy that he blamed on the Spanish inability or unwillingness to administer and protect natural resources and the specialized laborers who worked with them.

Alva Ixtlilxochitl and the Correlation between Resource Management and Governance

Alva Ixtlilxochitl, a historian and politician descended from Texcocan royalty, used his writings and political power to preserve traditional Nahua practices.[79] Like Muñoz Camargo and Chimalpahin, Alva Ixtlilxochitl sought to influence policy and defend Nahua territorial patrimony under Spanish colonial rule. As governor of Texcoco and Tlalmanalco, and therefore a representative of centralized governance, Alva Ixtlilxochitl's concern with local interests may be questioned. His writings and actions nonetheless confirm an approval of Nahua forms of engagement with nature and disappointment in Spanish authorities for the exploitation of natural

[79] Alva Ixtlilxochitl was the great-great-grandson of the Texcocan King Nezahualpilli (1464-1515), son of Nezahualcoyotl (1402-72). As told by Alva Ixtlilxochitl, during the Spanish military campaign against the Mexica, Ixtlilxochitl II (1500-50), Nezahualpilli's son and Alva Ixtlilxochitl's great-grandfather, betrayed his own brother, Cacama (1483-1520), Texcoco's last legitimate ruler. Instead of supporting Cacama's military efforts to rescue Moteuhczomatzin and other Tenochtitlan nobles, Ixtlilxochitl II captured Cacama and gave him over to Cortés (Benton 48).

resources.[80] Alva Ixtlilxochitl wrote the *Historia chichimeca* (1610-40) at the peak of Spanish exploitation of Nahua woodlands, timing that makes it likely that Alva Ixtlilxochitl reported successful Texcocan strategies of forest conservation and management in response to the rampant deforestation.

It is important to distinguish Alva Ixtlilxochitl's perspective from Chimalpahin's. A direct descendant of the last Texcocan and Mexica rulers (Chavero 5-6, Adorno 140), Alva Ixtlilxochitl was educated at the Colegio de Santa Cruz in Tlalmanalco, where students learned both scholasticism and traditional Nahua practices.[81] Although Alva Ixtlilxochitl wrote in Spanish, he sought to preserve the Texcocan past, transcribing pictorial and oral Nahua histories. In reconceptualizing the past, he tried to relate the Texcocan legacy to the emerging Spanish order.[82] In particular, he distinguished Nahua and Spanish forms of engagement with their natural surroundings, a difference reflected in their governance of Nahua populations.

Alva Ixtlilxochitl's documentation of Texcocan woodland administration included a record of forestry legislation enacted a century earlier by Nezahualcoyotl, his direct ancestor and

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[80] Bradley Benton has noted that it was the viceroy, and not a local official, who made Alva Ixtlilxochitl the highest-ranking indigenous official (45). Despite Alva Ixtlilxochitl's efforts to emphasize his Texcocan heritage, Texcocan authorities remembered Ixtlilxochitl II's betrayal of Cacama and ousted Alva Ixtlilxochitl from office after only four days. He was more successful as governor of Tlalmanalco, Chalco. As I will explain in Chapter 3, in that role, he manifested his concern with local interests when he helped the Chalca win a land dispute that guaranteed them ownership of strategic woodlands.

[81] The Colegio's scholastic educational program featured collective projects that were led by Franciscans and carried out by Nahua scholars, resulting in prominent historical and medicinal manuscripts such as the *Florentine Codex* or the *Libellus de Medicinalibus Indorum Herbis* also known as the *Codex de la Cruz-Badiano*. For more on the founding of the Colegio of Santa Cruz, see Elena Estrada de Gerlero. For more on Nahua intellectuals, see Kelly McDonough.

[82] As mentioned above, Alva Ixtlilxochitl emphasized his great-grandfather Ixtlilxochitl II's political allegiance to Cortés, casting the history of Texcoco as one of favorable relations with Spain, rather than emphasizing figures from the Texcocan past, such as Cacama, who resisted Spanish rule.

the former king of Texcoco. The historian explained that Nezahualcoyotl felt a duty to both natural and human subjects, aware of the connections between them:

> [Nezahualcoyotl] expanded the foothills, because he once had imposed strict boundaries to designate where one could extract wood for construction and firewood for everyday consumption, and he had imposed punishment by death to those who exceeded limits; and so came a time when he dressed as one of the great hunters of his kingdom . . . and close to the aforementioned boundaries he found a boy suffering of extreme poverty and privation, gathering small twigs to take home: the king told him, why do not you enter deeper into the mountain since there would be large amounts of dried wood to take along. The boy answered: I do not dare to do that because the king would take my life. Asking the child who the king was, he responded: a miserable little man because he takes from man what God gives them in abundance. The king then suggested that the child could easily enter beyond the limits that the ruler had circumscribed, that nobody would tell. . . . The boy became angry and began to fight him, telling him he had committed treason and he was an enemy of his parents because he was suggesting he do something that would cost them their lives; and in his return to his court, the king left orders with a servant (who from afar had been following), to take that child and his parents to the palace. . . [and] give them a certain amount of bundles filled with blankets and a lot of corn, cacao, and other goods, and he bid farewell, expressing gratitude to the boy for the redress he brought about, and for abiding by the laws that he had established; and from that moment on he ordered that they remove the mandated borders, and that all be permitted to enter

> the woods and avail themselves of the timber and lumber found within them, so long as they did not cut any live tree, act [still] punishable by death. (Alva 230-31)

According to Alva Ixtlilxochitl, Nezahualcoyotl initially enacted laws that required his subjects to extract wood for their daily consumption from specific locations in the forest, and imposed the death penalty for the cutting of live trees. After witnessing his "undercover operation," Nezahualcoyotl changed these regulations to eliminate the forest boundaries, although cutting live trees remained punishable by death.[83] The young child's unwavering fear of the law was evidence that Texcocan legislation was deeply ingrained in social practice. In contrast to sixteenth-century Spanish policies, Nezahualcoyotl's decrees were broadly disseminated and consistently enforced. Alva Ixtlilxochitl also portrayed Nahua law as responsive to changing circumstances; after he observed the dire conditions of his subjects firsthand, Nezahualcoyotl amended forestry laws to protect both the people and natural resources under his care.[84]

In discussing King Nezahualcoyotl's successful curtailment of deforestation, Alva Ixtlilxochitl linked conservation of natural resources to political harmony. He not only criticized Spanish mismanagement of natural resources, but also the failure to recognize and respond to sociopolitical threats to Nahua populations under colonial rule. The benevolent ruler that Alva Ixtlilxochitl depicted responded to evolving needs; the "miserable little man" became the ideal

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[83] As we will see in Chapter 3, under Spanish colonial legislation, punishments differed for Spanish and Nahua offenders. Spaniards who violated the law faced fines or exile, while indigenous transgressors risked exile and severe lashings.

[84] For a detailed explanation of Texcocan legislative and judicial systems, see Jerome Offner. Offner describes Texcocan law as "legalistic": "Rules were rigorously applied to certain crimes committed by specific types of people in certain circumstances" (242). Other familiar legal concepts that figured prominently in Texcocan jurisprudence include "the reasonable man" and precedent (242; see also 69-71).

ruler when he provided God's bounty to his subjects. His portrait of Nezahualcoyotl allowed Alva Ixtlilxochitl to both document timber legislation and sketch the qualities of a good ruler.

Other colonial historians were even more explicit in describing a Nahua leader's responsibilities to natural resources. The Dominican friar Diego Durán (1537-88), in his *Historia de las Indias de la Nueva España*, recorded a speech that was given to new rulers at the start of their reigns:

> Today you are charged with the hills, mountains, plains, caves, ravines, rivers, seas, springs, rocks, and trees, all is entrusted to you today and you will have to watch and ensure that it is not undone or annihilated; and although you will not carry it out with your own hand, with your own hand and warning you will arrange it . . . you will keep count and watch over everything created under the sky. (328)

In this model, effective rule depended on the health and sustainability of natural resources. It is therefore not surprising that to Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl, a lack of access to resources was connected to the Crown's failure to provide for Nahua populations.

Alva Ixtlilxochitl described other Nahua forestry regulations that promoted Texcocan political stability and common welfare. One example concerned the foothill of Tetzcotzinco, a landmark located on Lake Texcoco's eastern banks, just east of Texcoco's political center, and almost directly across the water from Chapultepec. He noted that the rulers of Texcoco had assigned responsibility for managing Tetzcotzinco to the regions of Tolantzinco, Quauhchinanco, Xicotepec, Pauhatla, Yauhtepec, Tepechco, Ahuacayocan, and Quauhnahuac (210), charging different areas with different tasks that included cultivation and transplantation of exotic flora and fauna and construction of elaborate staircases, walls, baths, sculptures, and hydraulic

systems (210-12). Alva Ixtlilxochitl thus depicted Tetzcotzinco as both a space for and a record of Texcocan Nahua history and politics. Alva Ixtlilxochitl credited Nezahualcoyotl for the natural beauty and architectural design of the forest and explained the network for the distribution of its natural resources. He also described a sculpture of Nezahualcoyotl erected there that featured carved symbols that represented his aptitude for engineering, principles of governance, and numerous accomplishments (Alva 210-11).[85] Spanish exploitation of woodlands thus stood in stark opposition to Alva Ixtlilxochitl's portrait of Nahua forest administration.

The *títulos* or Titles of Tetzcotzinco (1539) further explain Texcocan administration of and sociopolitical uses for Tetzcotzinco's woodlands. These documents are examples of *Títulos primordiales*, colonial narratives drafted by indigenous authorities to "authenticate an *altepetl*'s right to a territory" in response to an emerging need for legal justification of land occupancy (Lockhart, *The Nahuas* 410-11). In the *títulos* of Tetzcotzinco, Antonio Pimentel Tlahuitoltzin, governor of Texcoco (1537-64), and other Texcocan authorities documented, in Nahuatl, Texcocan possession of Tetzcotzinco prior to the arrival of the Spanish colonizers.[86] In reviewing Tetzcotzinco's history and advocating for continued Texcocan possession of the foothill, the *títulos* reminded readers that Nezahualcoyotl had protected the groups under his power in exchange for local natural products, labor, and voluntary compliance.

Governor Pimentel and the other authors also used the *títulos* as a space to record the

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[85] Charles Peters has problematized the conception of pre-colonial forests as spaces untouched by man, arguing instead that silviculture, or human influence on forests, was already evident in pre-Columbian cultures. He cites botanical evidence of complex pre-Columbian forest management strategies. This chapter corroborates Peter's findings, highlighting the thoughtfulness and care behind indigenous forestry management strategies, as well as their influence on developing Spanish colonial society.

[86] According to Charles Dibble, Pimentel was the twelfth *tlatoani* or ruler of Texcoco as early as 1537 ("Boban" 176). He was the son of Nezahualpilli and grandson of Nezahualcoyotl (Gibson, *Aztecs* 171).

details of Nezahualcoyotl's allocation of different territories. Pimentel warned the future rulers must be good, comply with the law, and "make your town strong," lest Nezahualcoyotl rescind the land grant (McAfee and Barlow 115-17). The *títulos* further suggested that the town would be "strong" and its ruler "good" only if natural resources were strategically distributed to the people of Texcoco. In an example, Xochipantzin, one of Nezahualcoyotl's heirs, received a land grant in exchange for constructing an aqueduct and redirecting water into Tetzcotzinco (McAfee and Barlow 112-15). The land grant thus allowed Tetzcotzinco's aqueducts to provide water to more remote regions of the Texcocan kingdom and Nezahualcoyotl to further centralize governance (Lorente 84).

The *títulos* also described the Spanish king's more recent assurances that Texcoco would continue to control Tetzcotzinco:

> In the year 1537 was when first arrived the Viceroy Don Antonio de Mendoza and when was given the tribute of four Reales, and when Don Antonio Pimentel governed and when lands were given when woodlands were given to people, to the ruler of each town. It first began there in Tetzcotzinco . . . on this date the people of Tetzcotzinco and Santa Maria Nativitas [are given] their share of land. Absolutely nobody may take away their lands, because they will pay their taxes on them, because God and the King gave them to them; no one shall give orders therein, neither Spaniard nor any other person. (McAfee and Barlow 119-20)

This agreement, which made continued ownership of these lands contingent only on the payment of taxes, should have given the local governments a degree of autonomy and protected them from trespassing, theft, or political interference by a "Spaniard []or any other person."

As in the case of Chapultepec, however, colonial officials failed to enforce the terms of this agreement. In an inquisitorial proceeding, Ometochtzin, another of Nezahualcoyotl's grandsons and ruler of Texcoco prior to Pimentel, gave testimony that described its violation by Spanish authorities:

> The seventh day of the month of July [1539], his reverence Fray Juan de Zumárraga . . . went to the foothill that is named Tezcucingo, where there were many sculpted idols on the rocks which his excellence mandated they be undone and broken, and those that could not be broken be set on fire, so after they be burned they be destroyed; and by his order the indians that went with the authorities began to destroy them . . . in a way that there would be no memory left of them. (qtd. in McAfee and Barlow 126)

Zumárraga, the Archbishop of Mexico, ordered a direct attack on an officially protected space, transgressing Texcocan jurisdiction and authorizing the destruction of "idols" that included the sculpture of Nezahualcoyotl.[87]

In contrast to Archbishop Zumárraga's characterization of the sculpture of Nezahualcoyotl as an idol, Alva Ixtlilxochitl and the *títulos* both described it as a physical record of his accomplishments as a ruler that included his effective management of Texcoco's human and natural resources (210-11 and McAfee and Barlow 117). Moreover, to Alva Ixtlilxochitl, the archbishop's misunderstanding of the function of the monument reflected his deeper confusion regarding Nezahualcoyotl's commitment to God, nature, and benevolent leadership (210). Alva Ixtlilxochitl identified Tetzcotzinco as the place where Nezahualcoyotl received confirmation of

[87] Amos Megged has cast doubt on Alva Ixtlilxochitl's account. Although an inquisitorial process yielded evidence that Zumárraga threatened to destroy structures in Tetzcotzinco in 1539, there were also eyewitness accounts of the presence of Nezahualcoyotl's statue into the 1550s (Megged 164-78).

God's existence (224-25). According to Alva Ixtlilxochitl, Nezahualcoyotl had never trusted Nahua "false gods, mute stones and sticks that held no power" (224), as proven by their failure to assist the Texcocan people in their conflict with the Chalca. Instead, Nezahualcoyotl secluded himself in the forests of Tetzcotzinco to fast and pray for God's guidance (224).[88] Some days later, a royal aide named Iztapalotzin brought the ruler out of this contemplative state when he told him about a vision he had just seen in the forest: "the disguised God, creator of all things" had pronounced that Texcoco would defeat Chalco and Nezahualcoyotl would soon conceive a rightful heir (225-27).

In strategically inserting Nezahualcoyotl and Tetzcotzinco into a Christian spiritual narrative, Alva Ixtlilxochitl asserted Texcoco's divine and patrimonial right to the land.[89] He contrasted Nahua treatment of forests with Zumárraga's erroneous perception of the same in a context of mismanaged forests, abused *hacheros*, arbitrarly appropriated woodlands, and the attack on Tetzcotzinco that occurred despite a supposedly binding legal agreement to protect the area. Alva Ixtlilxochitl discredited Zumárraga and other Spanish authorities for their failed, insincere, and/or abandoned efforts to manage and protect Nahua lands and populations.

Nahua Portrayal of Mexica Political Hegemony

[88] Alva Ixtlilxochitl also claimed that Nezahualcoyotl sang hymns to God, composing his renowned *Cantos* during this time of seclusion (Alva 225).

[89] In the region of Amecameca, the Chalca also tried to retain possession of the foothill of Chalchiuhmomoztli or Sacromonte in the face of Spanish efforts to appropriate Nahua territories. The initial site of Chalca settlement, Sacromonte's hilltop had long served Amecamecan rulers in spiritual and pragmatic functions, such as conducting surveys to define territorial boundaries (Osowski, "Passions" 611; Osowski, *Indigenous* 54). Both Chimalpahin's account of Sacromonte's history and its *Títulos primordiales* re-framed the foothill's spiritual function from a Nahua paradigm to a Christian narrative, just like Alva Ixtlilxochitl did in his portrayal of Tetzcotzinco (Osowski, "Passion" 629). According to Edward Osowski, connecting Sacromonte to a Christian narrative likely helped the Chalca secure its continued possession (Osowski, *Indigenous* 36).

As noted above, Alva Ixtlilxochitl reported Texcocan ruling strategies that effectively protected the interests of other Nahua groups under their power in exchange for sustainable local resources and specialized labor (210). According to both Alva Ixtlilxochitl and Chimalpahin, Texcocan and Mexica rulers incorporated the Chalca people into similar systems following their respective and collective victories over them. The Chalco region was south of Texcoco, east of Lake Texcoco, and west of the foothills of the Popocatepetl and Iztaccihuatl mountain ranges. Timber was particularly plentiful along the foothills of the Iztaccihuatl Mountains in the Chalco regions of Tlalmanalco and Amecameca, and Chalca *hacheros* were known for their ability to cut wood and manufacture finished products such as canoes. In the 1450s, the Mexica required the Chalca to furnish timber and skilled labor as tribute to the ruling *altepetl*. The Chalca's political subjection to the Mexica-Texcocan alliance thus entailed an exchange of products and labor, rather than the military occupation of their territories. Both historians suggested that this was the pattern Nahua groups followed when they colonized each other. The conquered populations continued to act as the autonomous managers of the natural resources and labor of their region, but now for the benefit of the ruling *altepetl*. Alva Ixtlilxochitl described the process:

> In the year 1465 . . . came the Chalca to build the regal houses across the empire . . . as punishment for their obstinacy and rebelliousness, bringing with them from their province wood, stone, and the rest of the materials . . . with such taxing and excessive work that it could be no worse in this world. . . . King Nezahualcoyotl accurately saw this calamity that afflicted the Chalca especially because of starvation, by which confused and hurt upon witnessing this, he mandated large houses called *jacales* be built, and that his aides load them with

> food for the Chalca laborers. Besides receiving this aid in part to withstand the famine that ran rampant at that time in their province; with this, crowds of them willingly came to labor seeing that by doing this they mitigated their hunger. (229-30)

In this description of successful colonization, tributary labor and natural resources were exchanged for protection of the Chalca. By allocating food and housing, Nezahualcoyotl both fulfilled his obligations to protect the natural and human beings under his care and strategically negotiated the incorporation of a vanquished group into a socioeconomic hierarchy.

Alva Ixtlilxochitl emphasized that, in contrast to the Spanish model of colonization, Texcocan and Mexica conquests did not rely on territorial seizure. The conquered Chalca extracted "their" resources from "their" province, and turned them over for use in the construction of the royal palaces. As we will see in Chapter 3, as governor of Tlalmanalco, Chalco, Alva Ixtlilxochitl successfully defeated Spanish directives that would have allocated Nahua lands to newly arrived Jesuit settlers, a victory that allowed Amecamecan and Tlalmanalcan communities to possess and manage their land, its natural resources, and their labor under Spanish rule.

Like Alva Ixtlilxochitl, Chimalpahin also conveyed how local resources and specialized labor had facilitated political diplomacy in the Chalco region prior to Spanish rule. Chimalpahin equated successful colonization with the sustainability of the colonized community, and viewed the autonomous management of patrimonial land, resources, and labor as a key colonizing strategy. Despite his political allegiance to his Chalca ancestors, Chimalpahin also showed solidarity with the politically ambitious Mexica, advocating their model for the subjection of Nahua groups over the Spanish model that he blamed for deplorable social conditions.

As in Tetzcotzinco, politically subjected groups were required to provide labor and natural resources as an act of respect for the ruling *altepetl*; the failure to do so was consequently interpreted as a lack of respect. According to Chimalpahin, in 1444 the Mexica demanded that the Chalca bring "grown and sturdy trees . . . thick wooden beams for construction. . . . It is necessary that you contribute to the house of Huitzillopochtli as your tribute and sign of submission" (*Relaciones* 97). When the Chalca refused, the offended Mexica began the campaign against them that led to their definitive conquest, arriving in Amecameca in 1465 for what would be an efficient military conquest: "by supper time we were already friends with the Mexica, by sunset the four parts of Chalco were already dominated" (Chimalpahin, *Relaciones* 102). The defeated Chalca were again required to provide natural resources and specialized labor to the Mexica, such that in 1482 "the Chalca were given the tributary service to bring Lord Tizocicatzin thick trees, dragging them from the slopes of the Popocatepetl. . . in effect, thick trees were dragged from that place by order of our beloved princes under whose care were all the polities" (Chimalpahin, *Relaciones* 216). These accounts of Chalca tributary work that occurred prior to Spanish colonization also highlighted the importance of specialization, as both Alva Ixtlilxochitl and Chimalpahin described obligations to provide timber and other construction materials and labor.

Another noteworthy feature of Chimalpahin's description is his apparently favorable view of the Mexica colonization process, notwithstanding the imposition of tribute obligations. Chimalpahin likened Mexica conquest to "friendship" and described Mexica princes, who did not attempt to occupy Chalca territories, as "beloved." Chimalpahin attributed the following statement to Moteuhczomatzin, ruler of the Mexica: "and just because you are and have been my conquered people, am I to take your lands that are your inheritance and your property? Has that

war in which you were subjugated, not yet ended?" (*Relaciones* 231). Rather than a loss of territory, political submission entailed a reformulation of social responsibilities.

However, Chimalpahin's description of the Spanish defeat of the Mexica potentially conflicted with this narrative. He again quoted Moteuhczomatzin: "Now you [the Spaniard] are the proprietor and owner of all of this, I, the Mexicatl, am no longer, now that the exercise of my arrows and my shields lie on the ground" (Chimalpahin, *Relaciones* 238). In this passage, the same ruler who had told the vanquished Chalca they did not have to surrender their lands appears to surrender Mexica lands to the Spanish conquerors. But rather than a simple and voluntary concession of Nahua territory, Moteuhczomatzin's bewilderment at the equation of land seizure and colonization reveals a complex notion of ownership. This notion rests on the traditional Nahua concept of transference of power, in which the Nahua called upon their new rulers and entrusted them with their *altepetl*, "to watch and ensure that it is not undone or annihilated" (Durán 328).

Chimalpahin also described Nahua responses to the Spanish appropriation of territories and subsequent mismanagement of resources and labor. After Spanish authorities implemented an unjust *tequio* or tributary system, enraged Nahua stoned the governor's office building; one month later, they confronted political authorities and threw stones at them, too (Chimalpahin, *Relaciones* 268). In contrast, neither Chimalpahin nor Alva Ixtlilxochitl mentioned any social unrest resulting from the military defeat of the Chalca by the Mexica, such that Nahua protests against the colonial government stood in contrast to the "friendly" or seamless transfer of power from the Chalca to the Mexica. To these two historians, the difference seemed to lie in the fact that the Mexica had prioritized the interests of Nahua communities over the control of their territories.

To Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl, history served two purposes: it was a means to preserve the traditional Nahua past, and also to assess and respond to Spanish exploitation of natural resources and specialized workers. These writers focused in particular on ancient Nahua forestry regulations, emphasizing the role of social networks around timber and woodcutting in ensuring the welfare of politically subjected Nahua groups. They portrayed traditional Nahua practices, based on the belief in an inextricable link between effective governance and respect for nature and labor, as successful and humane alternatives to the failed governing strategies of Spanish authorities. Muñoz Camargo, Chimalpahin, and Alva Ixtlilxochitl wrote at a moment when unenforced legislation, land reallocation, and depopulation of Nahua industrial communities all contributed to the rampant exploitation of timber and *hacheros*. In response, all three historians stressed the correlation between effective governance and conservationist approaches to natural resources and specialized labor. The Nahua, who lived under a constant threat of Spanish territorial appropriation, used their ability to conserve resources and manufacture finished products through specialized labor as a key bargaining chip in the struggle to maintain ownership of and autonomy over patrimonial land. As we will see in Chapter 3, forestry laws came to echo Nahua histories in that both served as records of devastation and evidence of indigenous actors' prominent role in the formulation of timber policies. The Chalca in particular tried to conserve woodlands and retain autonomy over their territories as a way to ensure their survival under the Spanish colonial regime.

Chapter 3. Toward a Universal Kingdom: Nahua Resistance to Timber Exploitation in Colonial Mexico

> [A tree] sprouts, grows, enlarges, develops, forms terminal growth, forms branches, forms branches in different places, forms foliage, leaves. . . . It sheds its leaves, sheds leaves; it drops its foliage. It grows dormant; it dries, it becomes a dried tree. Branches are removed, branches break off; they fall. [The tree] rises above us; it is torn up by the roots; it falls with a crash. It falls to the ground—broken, broken to pieces, shattered to pieces.
>
> It is chopped, it is topped, broken up, straightened, formed into a beam, cut. It is required; it is used for constructing houses. It is planed, hollowed, hollowed in many places.
>
> It produces suckers; suckers emerge. It forms a root; it takes root. It is transplanted, it is planted. Seeds scatter; they are sown; they swell, they swell up, they produce shoots. (Sahagún, *Florentine* 107; bk.11)

Fr. Bernardino de Sahagún (1499-1590), a Franciscan missionary who collaborated with Nahua scholars to write an exhaustive account of Nahua history, described the life cycle of a tree. Sahagún and his Nahua informants focused on the ways that the local people of central Mexico had engaged with natural resources. Trees had contributed to social welfare by providing timber for construction, and the Nahua had taken care to promote their regeneration. They had removed only limbs; they had used whole trees that had fallen "by the root" and shattered

naturally; and they had planted and transplanted them.[90] During the colonial period, the Nahua continued to protect their timber and forests. They responded to the exploitation of live trees by admonishing Spanish authorities and trying to bring forestry policy in line with local timber practices.

Over the late sixteenth and early seventeenth centuries, the Chalca from the regions of Tlalmanalco and Amecameca sought to "conserve" their people by protecting their trees and reducing the labor required of *hacheros*, or skilled Nahua loggers.[91] They used their abilities to identify, cut, and extract valuable timber as political leverage in order to preserve a measure of autonomy from the Spanish crown and manage their own natural resources and *hacheros*. As a result, in 1615 the Chalca were able to secure ownership of their territory and the right to continue to administer their forests (Chimalpahin, *Annals* 303). Historical accounts by Domingo Francisco de San Antón Muñón Chimalpahin Quauhtlehuanitzin (1579-1660) and forestry legislation enacted between 1579 and 1645 demonstrate that the Chalca actively contested deforestation and fought for labor regulations. They protested abuses by viceregal authorities and demanded policies that protected Nahua natural resources, skilled workers, and woodlands.

As I mentioned in Chapter 2, colonial writers that undertook to describe traditional Nahua governance focused on the strategic conservation and use of natural resources to ensure a

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[90] As in the case of the cochineal insect that I analyzed in Chapter 1, Sahagún did not indicate any human engagement with the worm until after it had fallen to the ground. He did mention that "it is torn up" and "branches are removed," but this is consistent with other accounts of Nahua methods of conserving trees. According to Fernando Alva Ixtlilxochitl (1568?-1648), a prominent Nahua historian, explained the Nahua could legally cut the braches off live trees, which could not kill the specimen, but they faced the death penalty if they cut a live tree at its trunk (230-31).

[91] Indigenous and Spanish officials employed the phrase "conservation of Indians" repeatedly in forestry regulations from 1592, 1605, and 1614. The expression referred to efforts to curtail the deaths and exoduses of indigenous people that resulted from inhumane labor practices (AGN, *Indios*, vol. 6, exp. 169, and exp. 193; Zavala, *Ordenanzas* 77, 79).

community's welfare. In this chapter, I explain how Nahua attitudes towards forests and felling timber influenced colonial forestry policy and guaranteed the Chalca's survival. As we will see below, colonial laws that were initially enacted solely to conserve trees gradually came to embrace provisions for the protection of *hacheros*, the competent management of woodlands, and the autonomous proprietorship of Amecamecan and Tlalmanalcan forests. Chimalpahin's testimony and the forestry laws of the era suggest that Chalca communities forced Spanish authorities to make the connection between the regulation of deforestation and indigenous conservation. Viceregal authorities employed strategies that echoed a Nahua sociopolitical approach to nature in which a dominant *altepetl* or city-kingdom received natural resources and services from its subjects, and protected those subjects in return. The Chalca prompted viceregal authorities to consider timber resources, woodcutting practices, and political harmony as indissolubly linked. In particular, the Chalca from Amecameca and Tlalmanalco strategically fought to remain the primary timber distributors of central Mexico. They contributed to the development of a colonial sociopolitical model that valued Chalca communities and the conservation of natural resources, a model that was compatible with Chimalpahin's conception of a *cemanahuac altepetl*.

Cemanahuac Altepetl or Universal Kingdom

Chimalpahin, a Nahua historian raised in Amecameca, Chalco and educated in Mexico City, recorded the history of his hometown as well as important events that took place in the Mexican *altepetl* during the early seventeenth century.[92] Although Chimalpahin relied on Nahua oral testimonies and pictorial accounts to reconstruct Chalco's ancient past through his own

[92] The Mexican *altepetl* refers to the geographic region of the Texcoco Lake basin, an area roughly equivalent to present-day Mexico City. It includes the island city of Tenochtitlan. Across the lake to the Northeast was the Texcoco *altepetl*, and to the southeast, the Chalco *altepetl.* Texcoco and Chalco are municipalities in the present-day State of Mexico.

colonial experience, his accounts were primarily a selective compilation of what he heard or witnessed, rather than a record of ancient Nahua history. An autodidact, it is believed that he had access to works of Spanish history and that he followed the sociopolitical debates of the era. Like his contemporaries, he recorded the Chalca's autochthonous social and governing practices and used them as a point of reference for evaluating, condemning, and influencing policies.

Chimalpahin wrote, in Nahuatl, about how the historically subjugated Chalca managed to become invaluable contributors to Spanish colonial society. His accounts, contemporary forestry legislation, and a lawsuit that disputed the rightful possession of Chalco's forests, all attest to the instrumental role that the Chalca played as prominent timber suppliers and enforcers of forestry laws. These sources suggest that the Chalca bridged viceregal and Nahua interests, skillfully negotiating the tension between promoting their role as timber distributors and resisting the ensuing exploitation of their resources and communities.

Chimalpahin denounced the treatment of Nahua communities under Spanish rule and blamed viceregal authorities for the continuous abuse of *hacheros* and forests. His use of Nahua paradigms such as *cemanahuac altepetl* or universal *altepetl* illustrated a disparity between Nahua and Spanish approaches to colonial governance (*Annals* 64-65).[93] Chimalpahin modified the term *altepetl*, a word that itself combined the nouns *alt* (water) and *tepetl* (hill) to mean a sociopolitical unit similar to a city-state or kingdom (Schroeder 119, 121). His use of the term suggests that the concept did not refer to a location or *what* the universe contained but rather *how*

[93] James Lockhart has translated *cemanahuac altepetl* as "universal *altepetl*" (Chimalpahin, *Annals* 65), and Susan Schroeder has equated it to "the kingdom ruled by Felipe II" (120) but without interpreting its significance. While studies by Gustavo Sandoval Garcia and Beatriz Pastor have explored possible interpretations of the word *cemanahuac*, none of these scholars has paid enough attention to Chimalpahin's use of the term in relation to the rest of his work to establish a definitive translation.

those elements were to interact.[94] While, Chimalpahin employed the term *cemanahuac altepetl* to refer to "the kingdom [previously] ruled by Felipe II" (Shroeder 120), he likely meant *how* the newly crowned Philip III ought to govern the kingdom, and, in particular, its Nahua subjects.[95]

That Chimalpahin used *cemanahuac altepetl* to commemorate the transfer of power from King Philip II to Philip III suggests that the Nahua historian trusted the Spanish monarch to rightfully govern and care for "everything that is created under the sky" (Motolinía qtd. in Sandoval and Pastor 16).

The fact that Nahua populations described their kings as "a shelter," a *puchotl* or ceiba tree, and an *aueuetl* [sic] or cypress tree indicates something further about Nahua perceptions of their rulers (Sahagún, *Florentine* 15; bk.10, ch.4). In the Nahuatl version of the *Florentine Codex,* Sahagún provided a description of the good ruler:

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[94] For a detailed explanation of Chimalpahin's use and modification of the term *altepetl,* see Susan Schroeder 117-53.

[95] The Nahua paradigm was the object of some interpretation by Spanish scholars of Nahuatl. Fr. Alonso de Molina, in his *Vocabulario en lengua castellana* (1571), defined *cemanahuac* as simply "the world" (f.15v.). Fr. Toribio de Motolinía, in his *Memoriales* (1536-41) elaborated:

> They call the whole world in this tongue *cemanahuac,* from *cem* and *anahuac*. This utterance *cem* is compoundable or divisible, as if we said, "*anahuac* all together." It is also a compound noun made up of *alt* which means water, and *nahuac* which means within or surrounded, that is, a thing that is found within water or surrounded by water, so that since all of the land, that is the world, is between water or surrounded by water, it is called *cemanahuac*, meaning everything that is created under the sky. . . . according to the true definition of the utterance *cem*: by removing the *cem*, *anahuac* is simply, "that which is between water or surrounded by water," that can be large and such that is greater than an island, because the name and word for island is *tlatelli*, whereby *anahuac* does not mean island but firm land and almost world, not the entire world all together, because it is missing the utterance *cem*, instead the vast land that we commonly call world. (qtd. in Sandoval and Pastor 16)

Motolinía's interpretation suggests that *cemanahuac* included the elements that comprised the universe, drawing its significance from the relationship between water, land, and "everything that is created under the sky."

> The ruler [*Tlatoani*]: The good ruler is a protector [*puchotl, aueuetl*]; one who carries his subjects in his arms, who unites them, who brings them together. He rules, takes responsibilities, assumes burdens. He carries his subjects in his cape; he bears them in his arms. He governs, he is obeyed. To him as shelter, as refuge, there is recourse. He serves as proxy, as substitute.[96] (15; bk.10, ch.4)

In his Spanish translation of the Nahuatl text above, Sahagún elaborated on this description:

> His Excellencies the king or emperor, archbishop or pope . . . that who provides shade, because the great one must provide shade to his subjects . . . *puchotl* is a tree that creates great shade and has many branches. *Aueuetl* [sic] is the same, because the ruler must be similar to these trees under which all of his subjects seek refuge. (*General* f.9v; bk.10, ch.4)

A ruler was to emulate a large tree, leading so as to protect all those under his care.[97]

As we saw repeatedly in Chapter 2, a Nahua ruler's responsibility extended beyond caring for human subjects to include ensuring the conservation of the natural world. A Nahua ruler was required to develop and regulate a deliberate and cohesive arrangement of human and natural elements. Chimalpahin's use of the term *cemanahuac altepetl*, along with his sharp criticisms of the exploitation of Chalco's forests, makes clear that he had similar expectations of the new Spanish king. The welfare of Chalca communities would depend on harmonious interactions between nature, labor, and governance.

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[96] Charles Dibble, in his translation of the *Florentine Codex* from Nahuatl to English, does not translate the names of the trees.

[97] The Nahua metaphor of a good ruler as a tree provides an interesting comparison to Andrés Laguna's advice to rulers, mentioned in the Introduction, that they follow the behaviors modeled by plants.

In contrast to these expectations Chimalpahin presented examples of viceregal mismanagement of Chalca human and natural subjects. I analized in Chapter 2 Viceroy Fernández de Córdoba's decimation of the revered cypress trees of Chapultepec in 1615. Such incidents threatened the survival of the *cemanahuac altepetl*, as they jeopardized the Chalca's natural resources, specialized *hacheros*, and autonomous management of both. As viceregal authorities had to regulate an unprecedented demand for timber, the Chalca became critical agents in the conservation of their timber resources and woodcutting communities. This situation gave the Chalca significant control over the woodcutting industry. They influenced regulations and helped shape a model of sustainable social organization under Spanish rule that was not unlike the aspirational model of governance of all Nahua and natural subjects, that Chimalpahin called *cemanahuac altepetl*.

Forestry Regulation through 1580

The goal of Spanish authorities in early colonial legislation was to regulate natural products in a way that would preserve and promote lucrative industries. Unlike Nahua timber regulations prior to Spanish rule, which had recognized the connection between forests and an *altepetl*'s social welfare, viceregal authorities simply ignored the effects of unchecked deforestation on Nahua communities.[98] Initially, Spanish authorities addressed only the quantity of wood that could be cut, over a given period of time, from a specified forest, and by a named community of *hacheros*. Thus, while licenses were issued in an attempt to regulate resources and *hacheros*, authorities failed to recognize that the regulation of any one factor

[98] Aside from Alva Ixtlilxochitl's description of King Nezahualcoyotl's evolving forestry regulations that I cited at length in Chapter 2, there is little extant documentation of Nahua forestry legislation prior to the arrival of the Spanish conquerors.

(quantity/location/timing/woodcutter) significantly impacted the others. They also failed to acknowledge the effect of each and every factor on Chalca communities.

Through Chalca initiative, colonial laws came to reflect the social complexity of the woodcutting industry in central Mexico. Laws that had solely conserved timber from Chalco's forests gradually addressed the human cost of timber extraction, that is, its effect on Amecamecan and Tlalmanalcan *hacheros* and their communities. Spanish authorities eventually exposed Mexico City's dependence on Chalca *hacheros* and acknowledged repercussions for the greater region.

Although early colonial legislation governing the Mexican *altepetl* was modeled on peninsular legislation, viceregal authorities gradually began to respond to local complaints and circumstances and developed policy around local timber and labor, that is, independent of the Spanish crown. Peninsular legislation revealed that by 1496, King Ferdinand (1452-1516) and Queen Isabella (1451-1504) had promulgated laws to protect particular species of trees in order to conserve their fruit and the protection from sun and wind that they offered cattle (*Novísima* 232; bk. 7, tit. 24, law 1). These laws required a royal license to extract timber from woodlands located within the boundaries of a city and limited vassals to extracting only small limbs, leaving the *horca y pendón*, or trunk and main branches, intact to ensure regeneration. The Spanish monarchy imposed a heavy fine on violators and reflected the ruler's belief that tree conservation could serve the "common good" of the kingdom (*Novisima* 232). Peninsular forestry laws of 1518 and 1547 responded to an increasing scarcity of wood that was damaging the shipbuilding and cattle industries (*Novisima* 232-34, 236). But rather than restricting the cutting of trees, these regulations required each jurisdiction to plant two trees for each one that was cut, and to plant

additional trees in vacant areas (233, 236). All of these conservation strategies were designed to benefit other industries.

In the mid-sixteenth century, forestry laws in Mexico resembled peninsular regulations. The *cabildo* of Mexico also sought to conserve trees to boost cattle production and benefit other profitable industries (Orozco 56, 57, 58-59; vol. 3). And in 1539 and 1559, Charles V issued decrees that affected transatlantic territories. The 1539 decree ordered those who held *encomiendas* to plant willows and other trees based on the number of residents in order to ensure an ample supply of firewood (*Novisima* f.114).[99] The 1559 law allowed indigenous people to cut wood from the forests for their personal use (*Novisima* f.113v). By 1579, however, viceregal authorities formulated forestry laws that reflected local conditions and concerns. While Spanish law likely influenced forestry legislation in central Mexico in the early and mid-sixteenth century, Chalca intervention would make colonial authorities respond to the broader social effects of deforestation before the century's end.

The Chalca had supported Hernán Cortés (1485-1547) in his 1521 military victory over the Mexica in Tenochtitlan, an allegiance that earned the Chalca the right to ownership of their territories and control of their resources (Chimalpahin, *Relaciones* 238). A license that Viceroy Luis de Velasco, Sr. (1511-64) granted on March 12, 1551 demonstrated at least one way the Amecamecas managed their timber resources under Spanish rule. Cristóbal de Oñate (1504-67), a prominent figure in the Spanish conquest of Mexico-Tenochtitlan, was granted permission to remove one hundred trees from protected forests in the foothills of Amecameca to build his residence in Mexico City. The license required Oñarte to cut the timber in the presence of

[99] Charles Gibson has defined *encomienda* as a "system of private labor and tribute jurisdiction" that was assigned to a Spanish holder (*Aztecs* 26). Unlike the tributary labor draft of the *repartimiento* system, an *encomienda* was tied to a particular community or small province (*Aztecs* 26-27).

Amecamecans who would certify that he had minimized the resulting damage. If the Chalca did not approve, the trees could not be extracted from those forests, where cutting had already been "outlawed and prohibited" (Zavala, *Libros de Asientos* 67). Oñarte's license demonstrates that, through 1551, the Amecamecans could manage their resources to the extent of confirming or revoking viceregal permission to cut trees.

Also in the 1550s, colonial administrators and members of religious orders reorganized the Chalco region and tried to influence Amecamecan and Tlalmanalcan control of Chalca resources and lands. Chalca leaders supported the geographic displacements that administrators and religious leaders viewed as necessary to centralize indigenous groups in the face of the epidemics and voluntary exoduses that were depopulating Nahua communities (Jalpa Flores, *La sociedad* 183-189). By the 1560s, Spanish authorities had incorporated the Chalca into the tributary system, by granting them lands and in exchange requiring them to pay taxes or render services (Jalpa Flores, *La sociedad* 217-218).

On March 21, 1579, Viceroy Martín Enríquez (1510?-83) issued ordinances that limited timber extraction, prohibited forest fires, and encouraged Chalca *hacheros* to trade their axes for *sierras*, or saws, to avoid wasting wood unnecessarily (Zavala, *Ordenanzas* 75-76). Only contractors who possessed an official license were permitted to take timber out of the forests. Viceroy Enríquez also banned the practice of cutting trees "by the foot" and limited *hacheros* to cutting limbs, leaving the *horca y pendón* intact.[100] He also prohibited forest fires to create space for cattle grazing. This mandate was unlike peninsular forestry regulations that were made to benefit of the cattle industry. Instead, viceroy Enríquez demonstrated his concern for conserving

[100] Neither later legislation nor the Nahua historical record indicate that Chalca *hacheros* modified their cutting techniques to comply with the 1579 mandate. On the contrary, a 1580 license explicitly required *hacheros* to bring their *hachas* or axes, not their *sierras* or saws (Zavala, *Fuentes* 332; vol. 2).

and regenerating the trees necessary for city buildings and public works (Zavala, *Ordenanzas* 75).

Moreover, the 1579 law showed that Chalca from Tlalmanalco had protested the exploitation of *their* forests and asked authorities to remedy the situation before Chalco's survival was threatened (Zavala, *Ordenanzas* 75).[101] The Chalca complaint argued that their forests were the primary source of timber for the region, such that their destruction would cause great "harm and loss to all of the Republic" (Zavala, *Ordenanzas* 75). Viceregal authorities approached the deforestation of Chalco's woodlands as an impediment to city construction projects. The 1579 laws did not make mention of the effects of timber regulation on Chalca communities. Nonetheless, the ordinances, in response to Chalca complaints, attest that the viceroy responded to Chalca demands.[102]

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[101] Nahuas initiated forestry reform through formal complaints to the viceroy. Ordinances and licenses often began: "the commoners of the town of Amecameca have related to [the viceroy] that . . . " (Zavala, *Fuentes* 385; vol. 2). The viceroy then would either charge the authorities with further investigation or, if the complaint was substantiated, order appropriate restitution or regulation.

[102] Enacting laws, of course, did not ensure compliance, and the 1579 legislation apparently suffered from insufficient consequences, lax enforcement, and inadequate dissemination. A law dated September 13, 1605 recognized that individuals had ignored the forestry laws of 1579, even though they had provided for punishments that included monetary fines, confiscation of tools, loss of licenses, forfeiting raw materials, lashings, or incarceration (Zavala, *Ordenanzas* 77). The Nahua were also subject to harsher punishments than Spaniards. Authorities fined Spaniards but lashed local transgressors (Zavala, *Ordenanzas* 76). The 1605 ordinances intensified punishments and threatened to publicly shame and then banish all violators (Zavala, *Ordenanzas* 78). The 1605 ordinances were once again amended in 1614, at which point Spanish authorities also held accountable the *jueces repartidores*, imposing heavy fines on them and stripping them of their positions. According to Gibson, a *juez repartidor* was in charge of the administration and distribution of indigenous workers, and acted as supervisors of *indios alguaciles* and interpreters (*Aztecs* 226).

Another barrier to effective enforcement of the 1579 regulations was inadequate dissemination. Written in Spanish, the law was posted in public plazas, addressed to the "Spaniards and other people" who destroyed the Tlalmanalca forests (Zavala, *Ordenanzas* 75). In 1605 Spanish authorities made the law public at the sites of *repartimiento* distributions (Zavala, *Ordenanzas* 78). The forestry laws of 1614, which sought to curtail exploitation and inform

A license granted to the Society of Jesus on June 19, 1580 showed both how colonial officials implemented the 1579 laws and the sociopolitical implications of massive private construction projects. The Jesuits, who formed in 1540 and arrived in Mexico City only thirty-two years later, were committed to the counterreformation. King Philip II, who had heard of the "good life, doctrine, and example of the religious people of this Order," sent them to New Spain to instruct and evangelize the native population (Pérez de Rivas 13). In response, the Franciscans, Dominicans, and Augustinians, sensing encroachment on their jurisdiction, complained about the Jesuit presence to the viceroy, to an inquisitor in Mexico, and also to officials in Spain.[103] Nonetheless, by 1592, the Society of Jesus had received royal permission to build their Casa Profesa or primary church (Chimalpahin, *Annals* 39).[104]

Viceregal authorities issued licenses that allowed the Jesuits to extract timber from Chalco's forests. These permits demonstrated the strict allocation of timber resources as well as the critical role of Chalca *hacheros* and their forests in the architectural development of the Mexican *altepetl*. Highly precise as to amounts and dimensions, the permit stipulated that the

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Nahuas of their rights in this regard, went further by requiring publication in local marketplaces and in Nahuatl.

[103] Chimalpahin described these complaints:

> When the Franciscans found out about it, they and the Dominicans, Augustinians, and secular priests assembled and went to complain to a convocation before the viceroy don Luis de Velasco and the inquisitor Santos García, and also don fray Domingo de Salazar, the bishop of the Philippines, was here at the time, and he said to them, "What are we to do? The judgment was made there in Spain and it was not done here, for the permission came from there." They had great arguments over it, then Franciscan friars set out for Spain to make a complaint. (*Annals* 39)

[104] While the licenses do not name the Jesuit church under construction, it was likely the Casa Profesa (1592). Viceregal authorities granted licenses for the church's official construction that spanned a twelve-year period. The licenses for extracting timber from Chalca forests and transporting it to Mexico City were from 1580-85 (AGN, *General*, vol. 2, exp. 889 and *Indios*, vol. 2, exp. 933; Zavala, *Fuentes* 333; vol. 2), and those granting official permission to construct the church were issued in 1585 and again in 1592 (AGN, *Indiferente*, vol. 5082, exp. 38). Jurisdictional conflicts with other missionaries likely accounted for this delay.

Jesuits could cut and carve, for example, "one thousand beams measuring 18 feet each . . . eight canoes, and four thousand planks each measuring two fathom [1.83 meters]" (AGN, *General*, vol. 2, exp. 889).[105] The license required that the wood be cut within a period of two years, but did not specify who had to cut or transport it.

On August 20, 1580, a separate but complementary license allocated the labor that would cut, carve, and transport the lumber for the Jesuit construction project. In this license, Spanish authorities used the *repartimiento* system to allocate twenty *hacheros* per week in four month rotations over the two year period.[106] The *hacheros* were to be recruited from Amecameca and Tlalmanalco for the sole purpose of cutting and extracting wood (Zavala, *Fuentes* 333; vol. 2).

One month later, on September 16, 1580, another license extended the two-year period in response to the Jesuits' complaints that the allocated timber could not be cut and transported in two years. Viceregal authorities gave the Society of Jesus twenty *hacheros* per week for four additional months (Zavala, *Fuentes* 332; vol. 2). In 1583, after the two years and four months had passed, authorities granted yet another extension. The Jesuits, who claimed that the extraction of timber remained unfinished on account of a "lack of Indians and other respects" (AGN, *Indios*, vol. 2, exp. 933), received two more years. While the first set of licenses showed that Spanish authorities could not adequately allocate *repartimiento* workers to a given project,

[105] This license did not specify the type of wood that the Jesuits could use. However, Andrés Pérez de Rivas in his *Crónica e historia de la Compañia de Jesús* (1646-54) explained that the Casa Profesa was made of cedar, a precious wood abundant in the foothills surrounding Mexico City (241, 294).

[106] Charles Gibson has described the *repartimiento* system as an institution that recruited, rationed, and rotated indigenous workers for specific, paid projects (*Aztecs* 224-36). This form of contracted work aimed to serve the public interest and benefit a broader class of employers than previous systems.

the last extension revealed that they were unable to manage an increase in demand for timber coupled with a decrease in available *hacheros*.[107]

At the same time that the Jesuits were requesting and obtaining revised permits, the people of Amecameca began to protest the inhumane working conditions that they believed to be the cause of the decline in the Chalca population (Zavala, *Fuentes* 384, 385; vol. 2). Despite laws requiring that Chalca workers "be paid their labor according to how laborers are paid and that they be given good treatment" (Zavala, *Fuentes* 333; vol. 2), Spanish authorities felt the need on December 15, 1580 to enact laws stating that the Chalca were not to be harassed, that they were to work an eight-day week instead of the customary eleven days, and that they were to be paid for their wood and their work (Zavala, *Fuentes* 384; vol. 2).[108] A second decree, enacted on the same day, responded to Chalca complaints that they were being forced to extract timber even when they were only contracted to gather firewood, "working them and exhausting them exceedingly" (Zavala, *Fuentes* 395; vol 2). This regulation, acknowledging that the overworking of Chalca *hacheros* led to the same lack of available laborers that the Jesuits complained about, ordered that contractors receiving *repartimiento* workers use them only for the stipulated tasks.[109]

Forestry Legislation from 1591 and 1592

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[107] According to Gibson, such errors were indicative of the circumstances that prompted reform of the *repartimiento* system. Regulations from 1601 sought to terminate the system in all areas of construction except mining and encouraged indigenous workers to choose their own employers. In 1609, a second round of reforms again tried to end the system, albeit in a more gradual manner (*Aztecs* 234-35).

[108] The legislation uses the word *semana* or week in such a way that we can infer that workers were rotated at the conclusion of a workweek.

[109] It is important to mention that both Spanish and Nahua authorities were to blame for the abuses of Chalca woodcutters. Spaniards made efforts to regulate quotas of workers and diminish onerous tasks, but they simultaneously held Nahua authorities responsible for the delivery of the stated number of workers. At a time of population decline as well as competing labor drafts, indigenous authorities would face arrests or jail sentences (Gibson, *Aztecs* 288, 233).

In the early colonial period, Spanish authorities issued separate licenses appropriate for a work-week rotation, itemizing the amount of timber permitted, the number of laborers allocated, and the amount of time for its completion. It was not until 1591 that authorities recognized that each of these components was a single process with a combined effect on Chalca labor and natural resources.

Rather than simply reiterate earlier laws, policies enacted in 1591 marked a pivotal stage in forestry legislation in central Mexico. Spanish authorities acknowledged that *hacheros* had often been mistreated, unpaid, and overworked, and that private labor allocations through the *repartimiento* system interfered with public works and Chalca communal responsibilities. Colonial authorities thus addressed the mismanagement of *hacheros*, once again prohibiting their employment in tasks other than those for which they had specifically been contracted. A separate decree required *repartimiento* officials to respect stipulated quotas and limit the number of contracted workers (AGN, *Indios*, vol. 5, exp. 778). Though these were still two separate regulations, colonial authorities had at least begun to show an awareness that unregulated working conditions contributed to the decline of the Chalca population. Further, they did so in response to Chalca demand, a development that gave the Chalca an important role in the formulation and enforcement of local legislation.

This process repeated itself again in 1591, when the Chalca complained that Spaniards and wood dealers were destroying the forests of Tlalmanalco (AGN, *Indios*, vol. 5, exp. 1068). The people of Tlalmanalco denounced unlawful access to the forest and extraction of its resources because as the forest receded, the source of their economic sustenance moved further from their communities (AGN, *Indios*, vol. 5, exp. 1068). As a solution, the Tlalmanalca proposed that the timber be taken instead from designated areas deeper in the foothills. They

advocated an increase in regulation rather than a total prohibition of access to the forest. This solution suggests a tension between preserving the forests and succumbing to the growing socioeconomic demand for their timber. As agents behind forestry policies, the Chalca protested deforestation and intolerable working conditions and successfully pushed for laws that would slow, if not stop, the decrease in their numbers.

By 1592, viceregal authorities had come to understand the connection between exploitation of timber and workers and the conservation of Chalca communities. Whereas licenses granted in the 1580s had allocated an arbitrary number of workers over an equally arbitrary period of time, Spanish authorities began to regulate the amount and type of timber to be extracted and processed by a set number of *hacheros*, over a set period of time.[110] The Chalca protested that *hacheros* were forced to work an eight-day week and to complete an excessive amount of labor in that time. A single *hachero* was required to haul thirty *morillos* or round logs measuring four *brazas* (some 6.8 meters) to the *cargadero* or loading station (AGN, *Indios*, vol. 6, exp. 169). Such onerous requirements meant that the *hacheros* either failed to fulfill their contracts or worked a longer week. The Chalca also told authorities that unskilled workers had been assigned to cut timber and produce lumber. When they could not complete their assignments, they had to subcontract, paying *hacheros* to finish their work (AGN, *Indios*, vol. 6, exp. 169). These kinds of abuses led to "great misfortune, death, and abandoned Chalca communities" (AGN, *Indios*, vol. 6, exp. 193).

To remedy this situation, Viceroy Luis de Velasco sought the expertise of "disinterested people that have experience in matters that deal with how much an Indian that has applied himself to the cutting and extracting of said timber could carry out successfully in one week in

[110] For a comparison of *tequio* requirements in Chalco before 1592 and the regulations promulgated in 1592, see Tomás Jalpa Flores, *La sociedad* 77-81.

order to accomplish his *tequio* in six days" (AGN, *Indios*, vol. 6, exp. 193).[111] Spanish officials thus tried to prioritize the conservation of *hacheros* over massive construction projects, reducing Chalca *tequio* requirements "because otherwise we will not be able to conserve the [Chalca]" (AGN, *Indios*, vol. 6, exp. 193).

Authorities further resolved to shorten the workweek from eight to six days, and to specify the type and amount of timber that could be taken out of Tlalmanalco's *Sierra Nevada*. They also stipulated the number of workers assigned to each task, and whether the lumber would remain at the base of the tree or be transported to the *cargaderos*. Under these modified tribute obligations, an *hachero* working alone was required to cut fifteen sheets of cedar clapboard (*tablas cubrideras*) or six boards of *ayaquatuil* measuring two *brazas* and carry the load to the *cargadero* in a span of six days.[112] Alternatively, four *hacheros* working together could cut a piece of *huyametl* measuring ten *brazes*, leaving it at the base of the tree from which it was cut.

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[111] Fr. Alonso de Molina defined *tequio* as "cosa que da trabajo," or "that which provides service" (*Vocabulario* f.105). While he did not associate the word directly with tributary service, he related all other words containing the root *tequio* to tribute (Molina, *Vocabulario* f.105). Charles Gibson has described tribute as a tax that native populations were required to pay through goods, currency, or service to viceregal and indigenous local governments (*Aztecas* 194-97). In this case, *tequio* seems to be the standardized regulation of woodcutting labor, contracted or required. The 1592, 1605, and 1614 legislation suggest that private contractors, *repartimiento* officials, and viceregal authorities all were expected to comply (AGN *Indios*, vol. 6, exp. 169, 193; Zavala, *Ordenanzas* 77, 79).

[112] Sahagún described three prominent species of large trees that grew in the forests surrounding the Valley of Mexico: *oiametl*, *aiauhquauitl*, and cedars:

> There are trees in this land called *oiametl*. That I know there are no trees of this kind in Spain . . . these trees are very big, very tall, and the mountains are filled with them. . . . There are other trees called *aiauhquauitl*, they are wild, long, and thick. They have light wood and belong to the pine species. It is very esteemed wood. . . . There are in this land very large trees that they call cedars. They have very thin leaves and galls like the cypresses though smaller. They have very fragrant wood, they are very tall and are make great cover [*rueda*] and are always green. (*General* f.11v-112v; bk. 11, ch. 6)

Curiously, although he left *oiametl* and *aiauhquauitl* in Nahuatl, he translated the species that is called *avevetel* in the Nahuatl version as "cedar." And although he equated two to European species, all three were native trees.

And yet another option called for five *hacheros* to cut and carve a canoe eight *brazas* long, again leaving it at the base of the tree (AGN, *Indios*, vol. 6, exp. 193). Nonetheless, as Chimalpahin would record, even these specific and precise ordinances did not effectively protect Chalca forests, workers, and communities.

Chimalpahin, Timber, and Chalca Welfare

Chimalpahin wrote that in 1604, at the height of unprecedented flooding of the Mexican *altepetl*, Viceroy Juan de Mendoza y Luna (1603-07) undertook a colossal engineering project and required the Chalca to provide the necessary timber.[113] Through an extensive canal system that would dam and redirect rain, overflowing lakes, and runoff, the *desagüe* or drainage project would empty the lakes of the Valley of Mexico.[114] Chimalpahin called the project Viceroy Mendoza y Luna's attempt to save the Mexican *altepetl* from imminent destruction (*Annals* 83, 101). The Nahua historian then emphasized the resulting exploitation of resources and laborers. He also underscored that the Chalca alone, as required, cut and transported the wood for the *desagüe* (Chimalpahin, *Annals* 103, 105, 107, 109, 111).

[113] Vera Candiani has decribed the *desagüe* project as "herculean" (2), and that the project was carried out speaks to the value the capital of the New Spain held for the political ellite.
[114] Referring to the 1604 floods, Chimalpahin asked: "What is happening to us in Mexico?"(*Aztecs* 83). Flooding continued and worsened, such that in 1607, he described it as "very frightening, the like of which had not happened two and a half years before" (*Aztecs* 101). Enrico Martínez (?-1632), appointed by King Philip III to lead the *desagüe* project, corroborated this assertion, explaining that central Mexico never experienced flooding before Spanish colonization. Martínez attributed it to the clearing of the foothills surrounding the Valley of Mexico (180). We can only speculate that Chimalpahin could have connected the flooding to the exploitation of the mountains adjacent to Chalco. He did, however, note that the runoff and avalanches came from the "Iztactepetl" or Iztaccihuatl Mountains, site of the Chalca timber forests (*Aztecs* 79, 103).

According to Chimalpahin, *hacheros* from the four parts of Chalco cut and felled *morillos* from the forests of the Popocatepetl and Iztaccihuatl Mountains (*Annals* 83).[115] They then carried them to loading docks on the shores of Ayotzinco. Chimalpahin emphasized that the *hacheros* suffered greatly under these excessive *tequio* requirements (*Annals* 83).[116] And yet, at the same time, he portrayed the Chalca as essential contributors to the Mexican *altepetl*. Chimalpahin explained that it was the "exclusive responsibility" of Amecameca to provide six thousand *morillos* (*Annals* 83, 103, 107, 111), simultaneously condemning the excessive burden and expressing pride in this important contribution. [117] In this case, the Chalca fulfilled a

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[115] Based on Chimalpahin's description of the Chalca *tequio*, it seems that the *morillos* for the drainage project were different from those described in the 1592 legislation. The 1592 regulations specified that "thin" *morillos* would satisfy an individual's *tequio*. Given the onerous task that Chimalpahin described, the drainage project likely required larger pieces of timber. As Sahagún explained, *morillos* or *quamimilli* varied: "they are round, some with bark some without, some thick and some thin" (*General* f.119; bk.11, ch. 6). The Nahuatl description of *quamimilli* in the same text noted variations in thickness: "The base is thick, the top thin. It has been topped. I top it, I carpenter it" (Sahagún, *Florentine* 115; bk. 11, ch. 6).

[116] Even though Chimalpahin described these obligations as tribute, they did not fall under a *repartimiento* system. The viceroy's projects became an additional burden for the Chalca, who were already spread thin between private *repartimiento* contracts and communal and household weeding and harvesting duties (Zavala, *Fuentes* 385; vol. 2 and AGN, *Indios*, vol. 5, exp. 613 and exp. 778). This is despite laws in 1601 and 1609 that called for ending the *repartimiento* system in the areas of "agriculture, building, and all other occupations except mining" (Gibson, *Aztecs* 233).

[117] Chimalpahin repeatedly noted that viceregal authorities singled out the work of the Amecameca woodcutters. Forestry laws of the era also described Amecameca and Tlalmanalco as specialized woodcutting and woodworking communities, and licenses indicated a demand for Chalca *hacheros*. Contracts required an *hachero* to be able to distinguish among types of wood and craft the desired product: planks, beams, columns, or canoes (Jalpa Flores, *La sociedad* 78-81; *Tierra* 41-42). Chalca *hacheros* were also thought to be more diligent and less prone to local political conflicts than other woodcutters. A license dated October 20, 1590 assigned Amecamecan *hacheros* to work on the convent of San Jerónimo because the woodcutters from Xochimilco originally assigned to the task "were sluggish and disobedient . . . and have not attended their duties in three months" (Zavala, *Fuentes* 92; vol. 3). And in a complaint dated November 14, 1603, one Francisco Aleman Pardo explained that he had, in the past, been assigned eight woodcutters from Amecameca and two oarsmen from Chalco; the new *repartidor*, however, assigned him workers from different communities. As a result there was tension in the cutting and transportation of the wood (Zavala, *Fuentes* 148; vol. 5).

communal service that was in keeping with the notion of a *cemanahuac altepetl*. Chimalpahin thus highlighted the tension around woodcutting for the Amecameca: it was a practice that both precipitated their depopulation and gave them the political leverage to secure a permanent and important position in colonial society.

In 1605 the Chalca again demanded that Spanish authorities enforce regulations to prevent illegal cutting of trees and exploitation of *hacheros.* The resulting revisions to the ordinances reiterated that the survival of the Chalca would require conservation of timber and workers. The Chalca identified unsustainable practices, arguing that overexertion led only to further exertion: exhausted workers cut and removed unusable timber, and consequently had to redo the task *(*Zavala, *Ordenanzas* 77). The Chalca also complained that they were often required to transport timber beyond the stipulated location. As a result, the Chalca were still unpaid, overworked, and left with unnecessarily damaged resources. In the 1605 legislation, Spanish authorities recognized that the Chalca faced "great distress, inconvenience, and in turn faced depopulation as they then became too ill and died" *(*Zavala, *Ordenanzas* 77). The law also noted that those who survived, unwilling to suffer and tolerate the hardship, tended to flee the province *(*Zavala, *Ordenanzas* 77*).* The 1605 legislation imposed harsher penalties and added a layer of specific instructions as to the types of wood and techniques for cutting. Its significance, however, was not in these details but rather its description of Chalca suffering and the ways they responded, namely, by fleeing and/or demanding enforcement and reform from the viceroy.

Chimalpahin's description of events between November 1607 and February 1608 suggested that the 1605 laws were ineffective. He criticized Mendoza y Luna's successor, Luis de Velasco (1607-11), for his failure to effectively oversee the *desagüe* project. He called Viceroy Velasco uninvolved ("he hardly got there before he returned" (Chimalpahin, *Annals*

107)) and unconcerned with the welfare of the Amecamecan people. Chimalpahin again highlighted that the Chalca were solely responsible for cutting and transporting the wood for the canals (*Annals* 105, 107, 109, 111). He noted that on November 5, 1607, Viceroy Velasco once again ordered that the four parts of Chalco cut and remove trees from their forests (Chimalpahin, *Annals* 105); and in December of 1607, Chimalpahin described the Amecamecans' delivery of their "separate and exclusive" quota of eleven thousand *morillos* to Mexico City (*Annals* 107). He explained that every married Chalca man, whether a skilled *hachero* or not, had been responsible for thirteen *morillos*, and that the whole town went to Mexico City together and "nobody stayed behind" (Chimalpahin, *Annals* 107).[118] In January and February of 1608, Chimalpahin mentioned that the Chalca were still required to cut trees and deliver the *morillos* to Mexico City (*Annals* 109, 111).

Beyond his criticism of the exploitation of Chalca workers, Chimalpahin further critiqued the *desagüe* project as inappropriate attempt to control nature. He called it Viceroy Velasco's attempt to save the Mexican *altepetl* from "drowning" and "becoming orphaned" (*Annals* 83, 101). Chimalpahin likened it to other Spanish attempts to manipulate nature. In one example, Spanish engineers led a disastrous excavation in Citlaltepec that killed fifty thousand indigenous people when the mountain collapsed (Chimalpahin, *Annals* 258-59). In contrast to the *desagüe*, Chimalpahin mentioned the Franciscan approach, based on the belief that God and bringing together God's people were the only sensible ways to influence nature. Chimalpahin enumerated Franciscan friars' attempts to stop the floods, which included processions, prayer, penitence, and ringing bells (Chimalpahin, *Annals* 101). He described a particular procession of twenty-four

[118] Although it is difficult to compare Chimalpahin's figures—amounts of wood over a period of months—to those stipulated in the 1605 legislation—amounts required per week—his point that woodcutting was now an obligation imposed on all the Chalca, not only specialized *hacheros*, was very clear.

thousand Spaniards and Nahuas, in which "the commoners and Spaniards joined, so that there the procession became one" (*Annals* 82).

The Chalca Versus the Society of Jesus: A Land Dispute

Chimalpahin simultaneously denounced the exploitation of the Chalca and praised their contributions to the physical architecture of the Mexican *altepetl*. He also emphasized Spanish authorities' dependence on Chalca resources and labor, which gave the people of Amecameca and Tlalmanalco significant political leverage. Chimalpahin suggested that to retain this sociopolitical power, the Chalca had to maintain autonomous control of forests and labor and foster the Crown's dependence on their timber and specialized *hacheros*.

The political and economic significance of the Chalca woodlands surrounding the Iztaccihuatl Mountains did not escape the attention of other groups with ambitions in both arenas, including the Jesuits. The Jesuits tried to appropriate the Iztaccihuatl foothills, but a majority of the Mexican *altepetl* sided with the Amecamecans and Tlalmanalcans. One of Chimalpahin's last entries described the legal victory of the Chalca that forced the Jesuits to desist, at least for the time being, from their efforts to occupy the territory:[119]

> Wednesday, the 10th of the month of June of the year 1615, was when they went to inform and formally notify the people of Amaquemeca Chalco that just by a grant the viceroy wants to give Iztaccihuatl, with two estancia sites, to the religious who are followers of Jesus, called our Fathers of the Company of Jesus, also given the name of Theatines; the religious wanted to take all the forest, and

[119] Scholars believe that Chimalpahin did not deliberately "end" the *Annals* (Lockhart in Chimalpahin, *Annals* 11-12; Schroeder 25-26). However, in reading them as a compliment to other documentation of the Chalca struggle to maintain control of their territories, the fact that the description of this lawsuit is one of the last entries gives his work a logical and natural conclusion (303).

> the sheep belonging to them would live there. But it could not be done, for the commoners of Amaquemecan and Tlalmanalco made a complaint about it; all the Dominican and Franciscan friars who are in charge of the *altepetl* there, and the Spanish residents there, were upset by it, so that the commoners provided formal proof of how the mountain is really their property. They made complaint about it before the viceroy and a suit was brought about it; the friars and the Spaniards became witnesses for the Chalca commoners so that the religious of the Company of Jesus abandoned [their plans] and withdrew (*Annals* 303).[120]

Chimalpahin explicitly blamed Viceroy Fernández de Córdoba (1612-21) for "just" giving away the forests that provided economic security to the Chalca and sustenance to Mexico's timber industry; and as recently as 1614, that same viceroy had re-enacted the timber regulations from 1605 with more severe punishments, in yet another effort to bring the continued exploitation of Chalca *hacheros* under control. Although Viceroy Fernández de Córdoba did not remark on the exploitation of workers to result from the *desagüe* project, he did note that the Chalca had yet to be remunerated for their services and resources. He encouraged them to "come to me and ask for what is convenient and the compensation that must be made to them" (Zavala, *Ordenanzas* 80). These gestures notwithstanding, Chimalpahin's celebration of the Chalca reappropriation of their forests suggests a condemnation of the viceroy and Spanish timber management.

Chimalpahin also addressed other issues related to the Iztaccihuatl territorial dispute. He noted the tension between the Jesuits and nearly everyone else in the capital of the New Spain (including other religious orders, indigenous populations, and Spanish residents). He warned that

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[120] Although Chimalpahin suggests a simple conclusion to the dispute over the Iztaccihuatl Mountains, the litigation proceedings indicate that the legal wranglings continued through 1645, decades after he wrote his account (AGN, *Tierras*, vol. 3474, exp. 1_1).

allocating Chalca territory to the Society of Jesus would take the Chalca's livelihood from them and cause a significant socioeconomic restructuring of the Mexican *altepetl*. He further claimed that the Society of Jesus wanted Chalca forests "so that their sheep may live in them," or, in other words, as land for ovine grazing.[121] According to Chimalpahin, the introduction of an ovine industry would further decimate Chalca forests and alter the regional economy.[122]

Chimalpahin also stated that the Jesuits were convinced to "abandon[] their plans and withdr[a]w" their claim to the Iztaccihuatl woodlands when they encountered the widespread belief among indigenous communities, secular and religious authorities, and Spanish settlers that the Chalcas were the legitimate owners and rightful managers of the timber and other resources found there.[123] That the Mexican *altepetl* sided with the Chalca in this dispute also said something about the industrial and sociopolitical priorities of the time. Colonial authorities had come to value a local timber industry in which "Indians would feel relief and would be well treated and well paid, because their conservation is invaluable to this kingdom" (Zavala, *Ordenanzas* 79) more than the development of a new industry based on sheep and textiles.

The transcript of a *cabildo* meeting in Mexico City on June 22, 1615 further illustrated the reasons that the Mexican *altepetl* united in support of the Chalca.[124] As governor of

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[121] As I mentioned above, it was common practice to burn forests to create and expand grazing space for cattle. Lane Simonian, in *La defensa de la tierra del Jaguar*, has noted that deforestation in Spain was largely a result of the demand for land to graze sheep in support of the expanding textile industry (47-64).

[122] The Iztaccihuatl woodlands were not the only territory that the Jesuits sought to acquire. For detailed descriptions of how the Jesuits acquired land and created self-sustained *haciendas*, including the Santa Lucia *hacienda*, see Andrés Pérez de Rivas (88), Francisco de Florencia (f.323), Charles Gibson (*Aztecs* 295), and James Denson Riley.

[123] According to Chimalpahin, the people of Amecameca, Tlalmanalco, Suichitepec, and Tenango, as well as Spanish entrepreneurs, Franciscans, Dominicans, and Augustinians all testified on behalf of the Chalca (Chimalpahin, *Annals* 303; AGN, *Tierra*, vol. 3474. exp. 1_1).

[124] In a future research project, I will analyze this lawsuit more closely. AGN, *Tierras*, vol. 3474, exp. 1_1 contains relevant documents that include a map of the disputed area and the objections

Tlalmanalco, Alva Ixtlilxochitl asked the *cabildo* to stand behind Amecameca and Tlalmanalco, but his argument went beyond the specific land dispute to strategically advocate for the preservation of Chalca timber practices. Alva Ixtlilxochitl offered proof of ownership and lamented that even consistent ownership and sustainable use had not always guaranteed the Nahua control of their land or its resources.[125] He argued:

> Granting attention to the fact that once again these rightfully owned lands, forests, and water have been denied [to us], we have created great opposition and for greater abundance and satisfaction of our justice and rights we want to present a [royal] decree in our possession and a royal letter [*ejecutoría*] granted by this royal hearing which grants us the right to protect our lands' forests. (Bejarano 151; vol. 20)

Alva Ixtlilxochitl acknowledged both that ownership of Chalca forests had been disputed in the past and that the Chalca needed to present a "greater abundance" of proof in order to repossess their woodlands and natural resources. He then echoed forestry regulations of the time, claiming that the land grant would deny the Chalca their means of sustenance and thereby cause harm to all of colonial society. More broadly, Alva Ixtlilxochitl convincingly connected indigenous and

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of the indigenous communities of Suichitepec, Tenango, Amecameca, and Tlalmanalco, materials that seem to echo the *cabildo*'s transcript. Still, the AGN documentation is dated from 1615 to 1645, indicating that the struggle over the land was long-term. Chimalpahin stated that the Jesuits withdrew their plans and "because of that the commoners likewise dropped their suit and did not finish it; the papers of the suit were left in the palace archive" (*Annals* 303). Both the dates on the AGN documents and Chimalpahin's description of an incomplete resolution invite further inquiry.

[125] Contrary to what apparently happened in this case, colonial authorities were expected to verify that land was unoccupied prior to issuing a land grant (Gibson, *Aztecs* 275). Objections, however, were common. The viceroy would then assure that the land transfer did not interfere with the legitimate claims of another party (Gibson, *Aztecs* 275-76). Written records of consistent land occupation were therefore critical to the Nahua's continued possession of their land.

colonial interests, arguing that opposition to the land grant amounted to "defending the rights of the city that is under its care, and helping us, unfortunate individuals who have continuously helped the republic by giving abundant resources and all else that said forests procure" (Bejarano 151; vol. 20). He elaborated on the likely detrimental economic ramifications of upholding the land grant:

> [The Spaniard] wants to become master of all of the forests and water from our districts in an effort to appropriate our grasslands and forests and get in the way so that we do not cut or extract the wood that is brought to this city. This is of great harm and loss to this republic because the wood transactions that take place will cease, and the timber and lumber would cost more . . . having a private owner.[126] (Bejarano 151; vol. 20)

Alva Ixtlilxochitl predicted the effect of the land grant on market prices.[127] After all, Chalca forests had supplied lumber for the *desagüe*, and the Amecamecan and Tlalmanalcan communities had provided the labor to extract it at low cost. Alva Ixtlilxochitl urged viceregal authorities to repay the Chalca in a way that would ensure their interests, and he insisted that contractors would pay more for timber and skilled labor under Jesuit ownership.

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[126] Unlike Chimalpahin's account, Alva Ixtlilxochitl's petition to Mexico's *cabildo* stated that Viceroy Fernández de Córdoba had made the land grant to a Spaniard with "sinister intensions and to our affront" (Bejarano 151; vol. 20). But these two accounts are not necessarily wholly inconsistent; files in the AGN clarify that a Juan de Arceaga petitioned to viceroy on behalf of the Society of Jesus. He specifically requested three areas for small cattle grazing in the Sierra Nevada of Amecameca and three *caballerías* or "agricultural farm units"(Gibson, *Aztecs* 275) in Tlalmanalco. As Alva Ixtlilxochitl explained, these plots would have strategically divided the Chalca from the coveted woodlands and cut off their access (AGN, *Tierra* vol. 3474, exp. 1_1).

[127] In her lecture, "Why the Market Theory of Value Originated in Spain,*"* Patricia Seed has argued that mercantilist colonial economies were nonetheless aware of market dynamics. This argument, however, fails to consider the role of indigenous populations as agents in this process.

Given this context, in which the Chalca lived under the constant threat of appropriation of their woodlands, Chimalpahin's recordkeeping can be interpreted as testimony of Nahua woodcutting practices that could serve the Chalca in future disputes.[128] Chimalpahin chronicled both the Chalca process for securing their claims to their forests and the recognition by Spaniards and Nahuas of the relationship between colonial prosperity and nature, skilled labor, and indigenous survival.

As Alva Ixtlilxochitl argued and Chimalpahin recorded, the Chalca strategically positioned themselves as key contributors to the "careful arrangement" (Durán 328) of colonial society. Chalca products, knowledge, and technical skills, as well as their contributions to policy development and resource management, allowed the people of Amecameca and Tlalmanalco to resist depopulation. The Mexican *altepetl* supported the Chalca and opposed the viceroy. Like Chimalpahin's notion of the *cemanahuac altepetl*, the Nahua historian promoted a model of social organization based on Nahua attitudes toward nature and labor, viewing them as inextricably linked to political harmony and the welfare of politically subjugated peoples. Like the Nahua communities that controlled other lucrative natural products, such as silk and cochineal dyestuff, the Chalca challenged unjust viceregal and private subjugation, fought to maintain control of their natural resources, and fostered reliance on their labor. As a result, and as Nahua histories and colonial laws illustrated, local communities experienced tension in promoting those same industries that, left unregulated, led to their exploitation. The Nahua would struggle to balance the control of resources, specialized knowledge, and technical and industrial practices well into the eighteenth century.

[128] James Lockhart has argued that Nahua writings were not merely discursive but also served as testimony in the event that Nahua practices were contested (176).

Final Thoughts. Local Experience and Universal Principles: Comparing Transatlantic Communication About Natural Products in the Sixteenth and Eighteenth Centuries

> There are many things about the management of the[] governments [of New Spain] that one cannot grasp, nor train oneself in, if not through experience. (Güémes 2)
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> In order for these kingdoms to make progress in the arts and trades, more efficient measures could be mandated . . . But one cannot lose sight that this is a colony that must depend on its motherland (*matriz*) Spain, and has to compensate her with something of use for the benefits that it receives from her protection, and therefore great judgement is needed to match (*combinar*) such dependency and turn it into mutual and reciprocal interests, that which would cease the moment that European manufacture and its products would not be needed here. (Güémes qtd. in Florescano 516)

Viceroy Vicente de Güémes Pacheco (1789-94) included these statements in his *Instrucción de 1794*, a document addressed to the incoming viceroy, Miguel de la Grúa Talamanca y Branciforte (1794-98). Güémes Pacheco offered advice to his successor and noted his reservations about the new political, economic, and social reforms the Spanish Bourbon monarchy had implemented during the second half of the eighteenth century. These reforms sought to rescind much of the political and economic power that the previous—Habsburg—monarchy had granted to New Spain over some two hundred years, and to restructure the

political and transatlantic commercial systems. In short, they sought to replace one form of governance with another (Florescano 491).[129]

Sixteenth-century intermediaries had relayed information about natural resources to the Crown so that it might improve its administration of the colony of New Spain. They had also taken into consideration the autochthonous sociopolitical organization, practices, and natural resources of each jurisdiction, whereas intermediaries from Bourbon Spain did not. The Bourbon monarchy of the eighteenth century also centered its enterprises on natural resources but, in making policy, failed to consider any detrimental effects on local populations.

In the *Instrucción*, Güémes Pacheco favored a model of governance shaped and influenced by experience, dictated by training and local circumstances, instead of a political system staffed by foreign dignitaries and guided by abstract principles.[130] In the same document, Güémes Pacheco also disagreed with the commercial sector's focus on the arts and trades. He reminded his audience that the perpetuation of a colonial state required successful manufacture of products, a warning that the failure to maintain political reciprocity would eventually lead to Mexico's emancipation.

Until and during the eighteenth century, indigenous populationsand Spanish settlers of New Spain had employed and valued autochthonous practices and related social programs, preserving a sort of symbiosis that sustained New Spain's colonized state. As Güémes Pacheco warned, however, eighteenth-century reforms brought along ideals, expeditions, and other enterprises designed to benefit the monarchy alone. Unwilling to consider "matching" mutual

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[129] Enrique Florescano has argued that the Bourbon presence in New Spain brought violent socioeconomic and political changes and initiated an era of true political subjection by the Spanish monarchy (492). Before this time, according to Florescano, the colony had not been so dependent on the monarchy.

[130] After the Bourbon reforms, royal authorities imposed a new system of political organization led by Spanish dignitaries instead of *criollos.*

interests, the Bourbon monarchy brought an end to reciprocity between indigenous populations and Spanish settlers.

As we have seen in previous chapters, tensions between local and foreign styles of governance, as well as theoretical and empirical governing practices, long predated the eighteenth century. Enlightenment-era *criollos*, or American-born intellectual elites of Spanish descent, attempted to bridge Spain and New Spain's ideals in ways that recalled sixteenth-century efforts. I have discussed how authors such as Diego Muñoz Camargo, Fernando de Alva Ixtlilxochitl, and Domingo Francisco de San Antón Muñon Chimalpahin Quauhtlehuanitzin fought to transfer and incorporate autochthonous practices and populations into an unfolding colonial society. These Nahua historians explored the indigenous strategies for fostering and benefitting from the Crown's dependence on their skills and products.

In the eighteenth century royal authorities appeared to disregard the importance of regional circumstances, notwithstanding the fact that recognition of these circumstances had led to successful mass production of sustainable natural products, in some cases even bringing social, political, and economic benefits to indigenous communities. At a moment when reason and experimentation were increasingly seen as vehicles for progress in the arts and trades, classical abstract principles no longer posed an obstacle to the authorization of indigenous knowledge. European intellectuals simply imposed an alternative set of universal ideologies to justify the appropriation of resources and modification of production practices in order to maximize royal gains, even at the expense of autochthonous tradition. As a form of resistance, settlers of New Spain continued to seek out and manufacture regional variants of natural products, explaining to royal emissaries that different expressions of industry had different impacts on the various sectors of colonial society.

Although the mass production of natural products in New Spain continued to rely on autochthonous knowledge and skilled labor through the eighteenth century, reforms that sought to re-discover native natural products would further threaten the remnants of autonomy that indigenous populations had derived from their engagement with the natural environment. Protestors, mainly representatives of the *criollo* elite, relayed information about natural specimens to the monarchy. Still, as Spain sought to disempower an increasingly self-reliant New Spain, and the residents of New Spain struggled to maintain a sense of autonomy, the *criollo* elite found strategies for negotiating between conflicting arguments and practices. As it had been in the sixteenth century, writing about nature became the means for responding to and resisting the imposition of social, political, and economic reforms, and for re-establishing and re-calibrating the balance of "mutual and reciprocal interests" between New Spain and its colonizing power.

Like the writers of the treatises and histories of the early colonial period, in the eighteenth-century scientific press, authors writing about natural products challenged the imposition of European universal ideologies onto local circumstances. Colonial textual productions contained contentious exchanges, which their authors approached in a similar way: rather than ignoring or rejecting opposing points of view, writers engaged directly with multiple perspectives in a process of sociopolitical negotiation and conciliation. Nicolás Monardes (1493-1588), author of the *Historia medicinal de las cosas que traen de nuestras Indias Occidentales* (1565, 1571, 1574), introduced, disseminated, and authorized indigenous knowledge about local plants with medicinal properties. Pedro Arias de Benavides (1521-?), author of *Secretos de Cirugía, especial de las enfermedades de morbo gálico y laparones y mirrarchia, y así mismo la manera como se curan los indios de llagas y heridas y otras pasiones en las Indias, etc.* (1567),

argued that European medicinal practices were irrelevant to New World circumstances and promoted autochthonous medicines and practices. Finally, José Antonio Alzate y Ramirez (1737-99), author and publisher of the *Gacetas de literatura* (1788-98), emulated Monardes and Benavides by privileging local knowledge, manufacture, and use of native natural products.

In what follows, I analyze how each of these writers and their textual productions worked to conciliate between local and general theoretical knowledge, as well as peninsular and American agents. This required the preservation and promotion of autochthonous identities, and these writers constantly strived to make the Crown and New Spain interdependent. The eighteenth century would see a drastic increase in the outsourcing of natural products from Spain, with a concomitant decrease in domestic economic gains (Florescano 519). Added to the further imposition of sociopolitical ideologies, it would only be a matter of time until New Spain, led by a *criollo* intellectual elite, would undertake the struggle to secede from the Spanish monarchy.

Sixteenth-Century Medical Treatises as Sites of Conciliation

In previous chapters, I analyzed sixteenth-century attempts to authorize practical information as knowledge, a problem of botanists and other informants since Gaius Pliny (23 AD-79 AD), who noted: "It is a very difficult act to make old things new; and to those that are new bring authority; and luster to those that we are accustomed to; and to those in the dark bring light; and to the displeasing, grace; and to the dubious, faith*"* (Hernández, *Historia* 6; Fernández, *Historia* 5; bk.1, ch.1). In his *Naturalis Historia*, a work that served sixteenth-century naturalists as the starting point for their own works that classified and identified plants, animals, and minerals, Pliny observed that the tension between empirical data collection and scholarly or theoretical knowledge made the acceptance of unknown natural elements problematic. That Oviedo and Hernández used this ancient principle to justify their method for collecting newfound

information suggests that the process for gathering and communicating information was as crucial as the information. Writers provided practical information about a particular plant, animal, or mineral, including its physical description and important uses, but as we saw in Chapter 1, these descriptions varied significantly in accord with the social processes at work in their respective contexts of production. Natural elements and their uses were deeply connected to abstract principles, aligned with or opposed to the social or political conventions of the time.

In the early sixteenth century, theological perceptions about the use of particular botanical products prevented the dissemination of profitable information and hindered attempts to incorporate autochthonous contributions into European practice. As we will see below, writing about natural products demanded the reconceptualization of indigenous populations and a process of updating, replacing, and/or refuting established and conventional knowledge. As a result, discussions about plants, animals, and/or minerals no longer privileged a scholarly approach. Sixteenth-century medical treatises used indigenous knowledge as a complement to an emerging institutional and scientific practice autochthonous to New Spain.

The House of Trade, the Council of the Indies, and the viceregal court faced intense demand for the immediate authorization of information about the flora and fauna of the newfound territories (Barrera-Osorio). Private entrepreneurs also found ways to disseminate, discuss, and systematize scraps of information about natural products. Nicolás Monardes became a key contributor to this enterprise. A prosperous doctor educated at the University of Alcalá, his *Historia medicinal* described the characteristics and uses of medicinal plants for a European audience. He set out "to write about all things that they bring from our Western Indies that serve the Art and use of medicine in order to remedy our ailments and illnesses" (f.2r). Similar to Laguna and Hernández, Monardes compiled information about natural products to improve the

health of the kingdom. Monardes, however, was not translating ancient knowledge into vernacular Spanish, nor was he undertaking the colossal task of listing and classifying all extant flora and fauna of New Spain. Instead, he took a significantly different approach. Having never set foot in the American territories, he identified and described only those natural elements that merchants, members of the court, soldiers, institutions, and curious laymen brought to his attention, and that he deemed transferable to Spanish society. Monardes then relayed their testimony, which he supported with his ability to grow well-traveled seeds and plants in his gardens. He used his professional expertise to turn hearsay into certified knowledge.

The quick and widespread circulation of Monardes's text among readers further distinguished it from those of his contemporaries. As a result of Monardes's publications, trade in the natural products he praised boomed.[131] He promoted mass consumption of innovative medicinal remedies at the same time that he provided the means for lay individuals and Native American practitioners to share information that was new to the European sphere. Monardes used his *Historia medicinal* as a platform for the reconciliation of different kinds of knowledge, or an instrument for relaying the continuous discovery, certification, and dissemination of information. Newly found medicines, regardless of their local origin or significance, could circulate among European physicians and consumers, free of pejorative cultural associations.

A review of Monardes's previous works reveals a steady progression toward narratives that reconciled different ideas about knowledge. In *Diálogo llamado pharmacodilosis o*

[131] As evidence of the impact of Monardes's texts on trade in lucrative products, Francisco Guerra has affirmed that tobacco, Indian balsam, *guayaco*, and *sarsaparilla* all experienced in increase in demand and trade after their publication (54). According to Daniela Bleichmar, Monardes's "text was frequently summarized, cited, and plagiarized—the true mark of an early modern best seller" ("Bodies" 85). It is also worth noting that its translation into English was carried out by John Frampton, a merchant with no medical training. The rapid dissemination of Monardes's text and the identity of the agents involved are evidence of its significant effect on the transatlantic economy.

declaración medicinal (1536), Monardes defended a humanist approach to medicine and blamed Arabic influence on ancient texts for the deterioration of the discipline. Like many of his Spanish contemporaries, including Laguna, Monardes believed that one must study the classical scholars directly, especially Dioscorides (40AD-90AD) (Pérez Fuenzalida qtd. in J.M. López 17). In his *De secanda vena in pleuriti* (1539) Monardes tackled the polemic around treating pleurisy. Practitioners of Arabic medicine treated patients by bleeding them from a point far from the affected region, whereas contemporary humanist physicians bled patients directly from the affected region (J.M. López 17). Monardes once again presented a confrontation between Arabic and Humanist thought.[132] He did so as a dialogue between two participants, offering arguments for and against each method. As the subheading of his text, *Inter Graecos & Aarabes Concordia*, made clear, Monardes wrote with the ultimate goal of reconciling the two philosophies (J.M. López 17). As we will see, Alzate's *Gacetas* portrayed the contentious debate related to Linnaean binominal nomenclature in a similar manner and with a similar result.

Monardes's description of the tobacco plant exemplifies the rhetorical strategies that he used in his *Historia* to once again simulate the conciliation of opposing positions. The primary sources of his second- and third-hand information from recent travelers were *Indios*, or indigenous people of the New World. In the tobacco entry Monardes simultaneously characterized indigenous practical experience as certifiable knowledge and documented the dubious moral conduct of his indigenous contributors. In particular, Monardes included a letter written to him in 1568 by a soldier named Pedro de Osma, who suggested that local knowledge

[132] José Antonio Maravall has analyzed at length the effect of the tension between early modern humanist thought and the ancient canons on European society.

was part of the Spanish political patrimony, and that the refusal of indigenous populations to share it willingly amounted to disloyalty to the Crown:[133]

> How many other herbs and plants of great virtues similar to these, must our Indies have: those of which we cannot reach or know of because the Indians as evil people and enemies of ours would never divulge a secret, nor the virtue of an herb even if they see us dying and in spite of being imprisoned. (f.62r-62v)

De Osma depicted the local people as secretive enemies, a threat to Spanish interests.[134]

Monardes, however, did not agree that indigenous populations deliberately withheld information; instead he faulted European settlers who did not seek it out (f.57r). Rather than tarnish his primary, albeit indirect, informants and cast doubt on the knowledge they provided, Monardes distinguished among indigenous groups and portrayed at least some groups as allies in the colonization process. For example, Monardes recounted an incident when indigenous knowledge of tobacco's healing properties saved Spanish and indigenous victims of attacks by an enemy indigenous group. The Caribe people, those "that eat human flesh" (f.34v), attacked Spaniards and members of the San Juan indigenous group with arrowheads steeped in a poison that contained "an herb or a compound made of many venoms" (f.34v). A San Juan farmer, knowing that the victims faced certain death, applied tobacco to the wounds as a last resort.

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[133] Jerome Offner has noted the close etymological relationship between "theft" and "secrecy" in Nahuatl (272).

[134] De Osma's position was not uncommon. As mentioned in the Introduction, Oviedo had described the indigenous population of Hispaniola in similar terms:

> Despite the interest taken or benefit that is presented, they do not want to reveal any such things, in particular those that Christians could benefit from, if they are medicinal (because this information is part of their realm). And the things that we have managed to learn have not been because of a willingness on their part, but because they have been unable to keep them secret. (*Historia* 378; bk. 11, ch. 6)

Unlike De Osma, however, Oviedo does not resent the indigenous populations for their attempts to protect medicinal natural products. He characterized their knowledge as spoils of war to be justly demanded by the victorious Spaniards.

According to Monardes, not only did the tobacco save their lives, it also saved the San Juan people from their fear of the Caribe, as the San Juan "freed themselves of everything, [the tobacco] eradicated the strength of the poison . . . and [they] no longer feared the Caribe because they found a great remedy to a desperate situation" (f.34v-f.35r). To Monardes, the San Juan people's local botanical innovation and willingness to assist ailing Spaniards were critical to the military defeat of the Caribe, a portrayal that starkly contrasts with De Osma's characterization of indigenous populations as enemies.

Monardes also noted the association of plants to autochthonous religious practices. Like all of the medicinal products he describes, Monardes did not strip tobacco of its local connotations.[135] He first characterized the use of tobacco by indigenous priests as diabolical, but then backtracked, turning to ancient authorities such as Dioscorides for another explanation of its effects, namely, tobacco's hallucinogenic or narcotic properties (f.37r).[136] The long-weathered justification, coupled with Monardes's description of the medicinal virtues of the plant, made

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[135] Daniela Bleichmar has remarked that:

> Objects and practices that in the New World were inextricably linked to ritual and religious beliefs were cleaved from that context and thoroughly cleansed before being shipped across the Atlantic. Stripped of their local connotations, New World natural substances resurfaced as global goods. ("Bodies" 99)

[136] This misperception of tobacco's medicinal effects would persist throughout the eighteenth century. In his "Memoria sobre lo que hacen los indios de la pipiltzitzintlis," dated November 9, 1772, Alzate attempted to refute that plants carried diabolical associations. He methodically analyzed the *pipiltzitzintlis*, separating the elements, planting the seeds, and identifying the plant, to conclude that it was mere *cáñamo*, or cannabis. Alzate joined Monardes in determining that any supposedly diabolical influence was actually just its narcotic effect. Alzate even chided,

> What important service would bring to the spiritual lives of natives [*infelices*] those who taught them that in their use of the *pipiltzitzintlis* the devil has as significant a role as they want to bestow him? . . . The prohibition of its use is necessary so long as the Indians persist their belief in its diabolic effects; ¿But is it not established [*constante*] that prohibition incites more and more that longing to carry out that which is prohibited? (Alzate, *Obras* 80)

Alzate's work, which came soon after the 1766 restructuring and regulation of the tobacco industry in the region, provided a new rationale for tobacco's use as well as an argument against its prohibition.

any immoral use seem both irrelevant and inconsequential. He did not exclude these unconventional uses for tobacco, nor did he mention them in opposition to other sanctioned uses. Monardes included them and engaged with them in a conciliatory approach that legitimated his sources and ensured commercial demand for the natural product.

Monardes published his work in three parts, a response to its constant evolution. The compilation process required adaptation and experimentation, as well as strategies to forecast and address the desperately urgent demand for the information. In the 1571 prologue to the *Segunda parte*, Monardes explained that, "having seen the benefit that [the first part] has brought, and how many have been cured and healed by its remedies, I agreed to continue the task" (f.31v). Monardes praised his first publication's immediate and beneficial health and commercial effects, and implied that the acquisition of information about natural products was a continuous endeavor.

Although De Osma's letter did not favor indigenous informants, it did praise Monardes's *Primera parte*. Monardes may well have quoted the letter in an effort to encourage other laymen to follow De Osma's example and contribute to the art of botany:

> Not being a learned man, nor involved in a profession from which to authorize such as your grace's, being a soldier that has followed war in these regions all of his life, I have done it as an enthusiast of your grace, on account of a book that your grace has composed. . . . Because we have order by which we should use the remedies that we have here, those of which we used to employ without rules or method, such that they did not work . . . now, it is quite the contrary, that by means of your grace's books, they have saved people that never thought they could have health or repair. (f.57r)

De Osma, in noting that Monardes offered the medium and the opportunity to translate lay observations into conventional medical practice, characterized the Sevillian physician as a central conduit that selected, certified, and broadcasted newfound botanical information.[137] In this role, it mattered little that Monardes had never been to the American continent.

Monardes considered time to be an impediment to an even more rapid dissemination of transatlantic information. As he acknowledged,

> It is our fault that we don't investigate [natural products], nor do we look for them, nor practice the diligence that is warranted in order to take advantage of their marvelous effects. Therefore I hope that time, as the greatest discoverer of all things, as well as diligence and experience will make them evident and to our great advantage. (f.30v)

Monardes remained at the mercy of his growing botanical samples. His desperation to collect, experiment, and broadcast information contrasted starkly with the slow and gradual growth of the plant samples. Monardes promised numerous times in the first two volumes that the findings "which take place will be included in a third volume" (f.63v). Such "to be continued" statements generated anticipation and above all the sense that a conclusion was imminent.

Monardes suggested that the process of acquiring natural knowledge was, like the plant samples themselves, in varying states of gestation. Monardes nonetheless expressed frustration at the temporal limitations that his subject matter imposed. He had found ways to circumvent the theoretical conventions of authorizing and disseminating newfound medicinal natural products through diligence and experience, but he could not alter time.

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[137] That De Osma's letter was addressed to Monardes and delivered personally to him by sailors or merchants who, in Monardes's description, "come to me as if I were the first one to discover them" (f.63v), are further evidence of the writer's growing reputation as a collector and analyst of information on transatlantic natural products.

Another writer on medicinal natural matter, Monardes's contemporary Pedro Arias de Benavides, was a Spanish surgeon and immigrant to the West Indies whose work filled a need for transatlantic circulation of improved information about medicinal plants and medical practice abroad. Benavides's *Secretos de cirugia* was not a work of scholarly instruction, but rather a manual for adapting the surgical craft to the circumstances of the New World.[138] To early modern society, medicine was a scholarly discipline, while the art of surgery was considered empirical. Benavides credited experience more than his physician counterparts, a likely result of his disciplinary affiliation, and he favored the constant innovation of surgical practices. Benavides, not unlike Oviedo, Hernández, and Monardes, criticized those who relied on dated knowledge, and argued: "we all know that God our Lord created the Ancients like us . . . and though the Ancients knew much, they could not know all properties and cures because time had not granted them the place or the experience of such things" (f.63r).[139] Benavides granted the same authority to untested local practices as those certified by conventional medical theory. He used a combination of personal experience and observation, conversations with surgeons, and anecdotal evidence to authorize his narrative and challenge prevailing European practices.[140]

Though a surgeon, Benavides also sought to reshape medicine as a scholarly discipline to reflect his belief that regional differences and local medicines made physicians trained in Spain useless in New Spain. He argued that individuals experienced illness differently in ports and

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[138] For insight into Benavides's likely course of study and training, and discussion of critical differences between surgical practice and medical practice in early modern Europe, see José Luis Fresquet Febrer (24-25).

[139] Benavides even criticized an unnamed Monardes for writing about territories he never visited: "That I know of some, mainly of doctors in Seville that by means of accounts and letters have written some things, I will not mention it, but will only speak of what I have seen" (f.54v).

[140] Fresquet Febrer has noted the importance and circulation of anecdotes in the continuing education of surgeons (51). Anecdotes fueled the growth of Benavides's reputation for curing ailments prior to the publication of his text: "All of the doctors and surgeons of Mexico went to see the cure as it was a marvelous thing" (Arias de Benavides qtd. in Fresquet Febrer 52).

inland locations (Arias f.30), and in patients of Spanish and American origin (Arias f.124v). Benavides was certain that Spanish medical knowledge was incompatible with New World experience, an opinion that was shared by doctors who had spent time in the colonies. These doctors "hazed" their newly arrived colleagues, playing pranks on them. In one such prank, a resident doctor would serve a newcomer the red fruit of the *nopal* cactus, which would turn the urine of the unsuspecting physician a deep blood-red color, scaring the victim so much that he would gladly buy the trickster's placebo. And, as Benavides described, the seasoned settler population was deeply suspicious of the newly arrived doctors:

> These and other pranks were played on the new doctors that went to the Indies, and the *indianos* [settlers] that have resided in this land for years . . . took as custom not to be cured by any doctor that had not spent two years among them, because they want these so-called doctors that just arrived . . . to practice all things related to medicine on others and not on them. (f.45v-46r)

To Benavides, the challenge was compounded by European doctors' skepticism toward local practices that were not committed to writing. He saw his colleagues react with fear when he used unaccredited natural products in his cures. In his entry about the maguey, Benavides sought to provide the missing writing:

> I do not believe that there is another tree in the world of so many virtues and properties, and that serves so many purposes. . . . The maguey as I have said has many benefits that I experimented with and did not want to share with anyone because the doctors of that land were not in agreement because of their own interests and profit, dealing with them on some occasions about this maguey they wondered why I bothered so much with it. That if at some point one of my cures

> failed, there was nothing set in writing with which I could save myself from prison because it is such an unknown thing. By God Almighty, all went favorably every time I used it. (f.39v-40r)

Unlike Monardes, Benavides used his personal experience with the maguey to guarantee its medicinal efficacy.[141] He also acted as an intermediary, negotiating between European protocols and local practices. After all, "all of the Indians in Mexico plant around their homesteads this maguey as if they fenced their houses . . . the maguey is the primary treasure of the Indies" (Arias f.40r, 41r). For Benavides, the combination of the written testimony of his experience and the common use of the plant in indigenous practice was sufficient to make his colleagues' fear appear ridiculous.[142]

Continuing to praise the experience of resident doctors over newcomers, Benavides related the cautionary tale of a "famous doctor who came from Spain" (f.52r) to the West Indies, where he became violently ill with cholera-like symptoms:

> He arrived overly confident in his [curing] ability . . . he threatened doctors and surgeons. . . . Even though there were local doctors that advised him what to do and certified the behavior of the illness in that land . . . he questioned whether they wanted to kill him and proceeded to [treat himself] by taking a cold bath . . . and as [his health] was so neglected, he wound up dead. (f.52r-52v)

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[141] His experience with the plant was apparently substantial, as his description of the maguey was one of the more detailed in his text. Benavides enumerated specific uses for all of the parts of the plant, such as medicine, clothing, and needles, in a demonstration of both the plant's practicality and native populations' resourcefulness, which starkly contrasts with European practices in which demand for one part of a specimen led to the waste of the remainder.

[142] It is worth noting that Benavides did not appear interested in profiting from the maguey trade. He did not work with merchants to transport maguey throughout the colonies; instead, Benavides's medicinal, natural products moved around the Americas courtesy of sailors and ship owners who were willing to transport plants from New Spain to other parts of the Indies (f.39r).

To Benavides, not only was Spanish medical education irrelevant in the colonies, it actually prevented doctors from acquiring the knowledge necessary to ensure the survival of Spanish settlers. Benavides conveyed that local practices would be recognized and implemented only when the conventional European frame of reference was reconfigured.

Benavides concluded his entry on the maguey plant with an anecdote about Ángel de Villasaña, a Spanish nobleman known for tricking newly arrived doctors by hiding purgative powders in their meals. In an elaborately orchestrated hoax, a Dominican friar tricked the trickster, getting Villasaña to ingesting a laxative that made him acutely ill and put him at the mercy of one of his former victims. That doctor, now well versed in local medicine, quickly cured him with the fruit of the *nopal* (Arias f.48r-f.49r). Benavides credited experience, local natural medicines, and a process for unraveling conventional knowledge as the causes for the change in these individuals' behaviors. Both Monardes and Benavides acted as liaisons between the learned community and the general population, turning their printed texts into spaces for the recognition and reconciliation of seemingly disparate spheres of knowledge. Understanding came through direct or indirect experience and knowledge was derived from local plants, informants, and practices. These ways of generating knowledge offset the ideological colonization of the American territories to allow for the reciprocal exchange of knowledge. And as this process gave way to mass production of natural medicinal products, the Spanish monarchy and its colonial possessions became increasingly commercially interdependent.

Natural Products and Subversive Identity in the Eighteenth Century

Bourbon reforms, contained in the *Real ordenanza para el establecimiento e instrucción de intendentes de ejercito y provincia en el reino de la Nueva España* (1786), called for the aggressive reorganization of political, economic, ecclesiastic, and social structures. Among other

modifications to the current colonial structure of New Spain, peninsular authorities sought to eliminate the units of local government known as *alcaldias mayores* in order to make the governance of all sociopolitical jurisdictions and the condition of all subjects uniform.[143] These sweeping changes reverberated through autochthonous industries, especially since those that relied on an indigenous labor force were most affected by the dissolution of the post of *alcalde mayor*. This Spanish official was charged with collecting tribute from indigenous communities and hearing (and, when justified, addressing) the complaints of the indigenous population (Florescano 500). In reality, these officials exploited the *repartimiento* system in order to maintain the commercial monopoly in their region (Florescano 501).

This fierce Bourbon control over colonial administration, intended to prevent local exploitation of resources and funds, simply resulted in further depletion of New Spain's natural and human resources and fueled mounting opposition from *criollos* (Saldaña 33). The Spanish monarchy ignited a conflict that underscored the tension between local intellectuals and peninsular reformers. Not unlike Benavides's inexperienced doctors, arbitrary reforms and inexperienced Spanish administrators attempted to manage a region and a population that they did not know well or understand.

The Bourbon monarchy, led by Charles III, continued to promote the exchange of information about natural products between Spain and Mexico as a way to improve the administration of colonial transatlantic territories into and throughout the eighteenth century. The

[143] See Article 9, 13 for the exact mandate (*Real ordenanza* 13, 21). Other reforms that caused structural political changes included significant reductions of the viceroy's power and the replacement of *criollo*s in the *Real Audiencia* with Spaniards loyal to the monarchy (Florescano 499-500). For more detailed accounts of the political, economic, and social climate of the late eighteenth century, see Florescano and Juan José Saldaña. All of these reforms can be found in the *Real ordenanza para el establecimiento e instrucción de intendentes de ejercito y provincia en el reino de la Nueva España*. Güémes Pacheco's *Instrucción* can be read as a contemporary reaction to the new policies.

role of intermediaries and informants between the two regions remained largely unchanged. The Crown would continue to distribute surveys requesting specific information or objects and/or appoint individuals to conduct botanical expeditions in the American territories as in Francisco Dávila's *Instrucción*. Through such enterprises, learned botanists or physicians verified and recertified information about plants, animals, and minerals, as well as their related products and practices, and connected them to sociopolitical occurrences.[144]

The prominent botanical expedition led by Martín Sessé (1751-1808) in 1787, however, was unlike previous searches for natural products that could improve the administration and governance of distant provinces.[145] Instead, by order of Charles III, Sessé sought strategic local products that would benefit the monarchy alone. Eighteenth-century scientific enterprises, and the Sessé expedition in particular, reformed the collecting and classification of natural elements and reconfigured autochthonous industrial practices, aligning them with the political reforms.

Expressions of industrial production related to native products and autochthonous practices were severely compromised. Several factors guided the restructuring: increasing financial gains for the monarchy, reducing the centralization of economic power of autochthonous industries, and definitively subjugating New Spain economically, socially, and politically to the Bourbons. The monarchy aimed to eliminate any benefit that local manufacture

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[144] Steven Harris has imagined a circuit of knowledge about natural products that is more than a simple connection between the object's place of origin and its final destination. Harris has visualized threads that tie the object to other artificial objects: texts, navigation charts, ships, parchment, etc. Emphasizing the explosion in mobility of the era, he forces us to consider how that mobility was orchestrated and above all financed, highlighting the crucial role of corporations that facilitated travel in the dissemination of information (275).

[145] Miguel Ángel Puig-Samper and Francisco Pelayo have enumerated the scientific expeditions that the Spanish crown and other European kingdoms launched from the sixteenth to the eighteenth century. They have also compiled a thorough bibliography of scholars who have researched this topic. For a detailed analysis of the mechanisms, responses, and/or results of such enterprises, see also Jesús Bustamante "La empresa", George Gascoigne, and Steven Harris.

could generate for New Spain. Viceroy Güémes Pacheco, again, praised the industrial capacity of New Spain and noted his concerns. "It is very difficult to prohibit the manufacture of products produced here in the[] kingdoms [of New Spain], and it is even more difficult to figure out everything that is manufactured here" (91-92). He was also quick to point out that "the only means to destroy the manufacturers [of New Spain] is to offer reasonable prices to those same European products" (93). If the cultivation and manufacture of products were to expand, or if those same products were to lose their global value, indigenous communities would suffer devastating effects. As we will see below, Alzate considered the same outcome with respect to the expansion of cochineal cultivation.

Still, attempts to reform industry were not as uniform as those of sociopolitical institutions. Industrial reforms ranged from the establishment of the *Estanco de Tabaco*, a royal monopoly over tobacco production in 1764, to the reconfiguration or anti-monopolization of the cochineal industry that ordered participants to expand cultivation and dyestuff production into new regions (*Real ordenanza* 70-71).[146] As mentioned above, however, in removing the *alcalde* mayor, Spanish authorities eliminated tributary systems, decentralized industrial monopolies, and adjusted labor practices to profit from products intended for an exterior market. Through these strategies, the monarchy prioritized its own gain over the protection of local populations, disrupting any "mutual and reciprocal interests" (Güémes 90) between indigenous populations and colonial governance as well as between Mexico City's *criollo* ellites and royal dignitaries.

It was in this context that José Antonio Alzate y Ramirez published his scientific texts, echoes of Monardes and Benavides in their reliance on autochthonous knowledge, contemporary scientific currents, and the power of printed matter in their efforts to reconcile local and Spanish

[146] For a comprehensive study of the development of the tobacco industry in Mexico and its monopolization by the Spanish crown in 1764, see Gerardo Sánchez Díaz (12-13).

endeavors. Alzate, too, managed to present competing arguments as complementary voices engaged in mutually productive dialogue, transcending scientific writing to wade into the sociopolitical debates of the time.

Alzate, of Spanish ancestry, was born in Chalco, Mexico. He studied at the Real Pontífica Universidad de México and was later ordained as a priest. Alzate continued his scientific training as an autodidact, reading or at least following the literature on transatlantic technologies and ideological currents. He published and edited multiple scientific journals.

Although other journals circulated in Mexico in the eighteenth century, Alzate authored and compiled the first Mexican journals with scientific content: *Diario literario de México* (1768), *Asuntos varios sobre ciencias y artes* (1772-73), *Observaciones sobre la física, historia natural y artes útiles* (1787-88), and *Gacetas de literatura de México* (1788-95).[147] Through his publications and particularly as writer-editor of the *Gacetas* he covered a wide range of content such as medicine, pharmaceuticals, astronomy, architecture, agriculture, geography, mathematics, mythology, public health, mining, and metallurgy, to name a few.[148] Alzate emphasized technical innovation and especially those innovations considered to be autochthonous to New Spain, such as the *malacate* or winch, bell making, hydraulics, and milling.[149]

In a *Gaceta* from 1788, Alzate described the criteria, methodology, and objectives that guided his writing:

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[147] For a complete description of the evolution of the scientific press in Mexico and other parts of Latin America, see Jesús Álvarez and Luis Reed Torres. For studies of Alzate and his role in the development of the scientific press in Mexico, see Alberto Saldino García and Leonel Rodríguez Benítez.

[148] For an analysis of Alzate's work in the fields of medicine and pharmaceuticals, see Carlos Viesca and Ana María Huerta Jaramillo; in astronomy, Marco Arturo Moreno Corral; in public health, Alba Dolores Morales Cosme; and in mathematics, Yolanda Lazo Tiscareño.

[149] For a thorough study of Alzate's work on innovative autochthonous technologies, see Ramón Sánchez Flores.

> I do not trust my feeble strength to hold the course that I have set; I am satisfied that other people whose humility is more valued than their literature will assist in its execution upon realizing that they have licit means to express their ideas. An endeavor of this character brings them an innocent conduit by which they can disseminate that which they judge useful. (vol. 1, no. 4)

Similar to Monardes, Alzate described the *Gacetas* as an accessible space for communication between him and an audience of Spanish and *criollo* intellectuals, as well as between that learned sphere and the general public.[150] Through this privately-run publishing enterprise, Alzate prioritized the application of autochthonous scientific knowledge to his immediate New Spanish reality (Rodríguez 653). He did so in an effort to enlighten his audience, to record the technological and agricultural accomplishments of indigenous populations, to reflect on worthwhile topics, and to discredit unfounded assertions about the inferiority of the Spanish colonies (Cruz 634-45).[151]

Alzate strategically conveyed scientific information in the form of simulated dialogues, in which multiple voices engaged in continuous and even tense discussion that reflected the most up-to-date information and debates. In all of his journals, he commonly published letters and supplements that challenged or opposed his own ideas. Among other prominent controversies discussed in these journals, Alzate was vehemently opposed to royal reforms aimed at reconceptualizing and reintroducing natural products into a reorganized New Spanish society.

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[150] Rosalba Cruz Soto has asserted that Alzate's reading circles were of an esoteric nature. Still, Cruz Soto has acknowledged that, in the late eighteenth century, the public disseminated the content of the *Gacetas* by reading it out loud in *tertulias* or intellectual gatherings, on street corners, and in their homes (648).

[151] In promoting Mexico's innovation and technology, Alzate attempted to counter the widely read theories of French naturalist George Louis Leclerc, Count of Buffon (1707-88) and German philosopher Cornelius de Pauw (1739-99), both of whom criticized Americans as a weak and inferior species (Cruz Soto 626-27).

Spanish scholarly authorities called for new systems of naming and classifying nature, and political authorities called for the revamping of production systems and even the redevelopment of products themselves. Alzate, challenging the imposition of foreign ideologies and promoting local practices and natural products, attempted to equalize the scientific contributions of Spain and New Spain.

The Crown authorized an expedition to the Spanish territories to "eradicate doubts" about new botanical products.[152] As mentioned above, royal authorities sought to revise knowledge about natural specimens and increase profits from the colonies. As the monarchy had recognized in the sixteenth century, the gathering of information about plants and animals and especially natural products continued to be a vital instrument for the growth and perpetuation of the Spanish empire. While Spanish botanists, physicians, and officers of the court continued to use information about natural products to inform socioeconomic practices, in the eigteenth century they favored different systems of collection. They scrutinized information gathered in the sixteenth century, deemed it antiquated, and reinterpreted it with an eye toward the benefits it could provide to the European market. In his *Gacetas* Alzate criticized this appropriation of a colonial body of knowledge and underlined the tension between foreign European universal ideals and more relevant autochthonous forms of knowledge.

In noting the need to "perfect . . . the current state of the Natural Sciences," the Crown referred to the Swedish doctor Carl Linnaeus (1707-78), whose universal classification system

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[152] The official decree that mandated the terms of the botanical expedition (*Real Cédula del 20 de marzo de 1787, por la que se establecía en su forma definitive la Expedición*) read:

> not only with the general and important objective to promote the progress of the physical sciences in order to eradicate doubts, and adulterations that exist in Medicine, Dyeing, and other useful Arts, and to increase commerce, but also to substitute, illustrate, and perfect through organization the current state of the Natural Sciences, the original writings that Doctor Francisco Hernández, Protomedic for Philip II left. (E. Álvarez 60)

categorized a plant according to its sexual reproductive characteristics and then labeled it with binomial nomenclature.[153] Both the expedition and the instruction of botany in Mexico's universities were required to follow the mandate of the 1787 expedition and employ Linnaeus's methodology. Martín Sessé, the leader of the expedition, described the Real y Pontificia Universidad de México's adoption of this system in a statement to King Charles III dated May 27, 1788: "Professor Vicente Cervantes in an erudite discourse gave a clear idea of the primary Botanical Systems, concluding by manifesting the advantages of Sir Carl Linnaeus as he who has been adopted by your Majesty for this university" (E. Álvarez 62). Alzate noted in the *Gacetas* that Vicente Cervantes (1755-1829), one of the two principal explorers involved in the expedition and chair of the newly founded biology program at the university, argued that scientific experiments and nomenclature should be restructured according to the specifications of the Linnaean (and soon to be universal) system. Alzate, in turn, argued against the Linnaean system, claiming that it was based on an irrelevant characteristic (namely, a plant's reproductive behavior). As a result, he believed that the system, and the reforms it implied, stripped natural elements of local nomenclature, social associations, and in some cases even altered manufacturing processes and final products. As a political act, the Linnaean system of classification represented yet another ideological imposition on Nahua populations and, more directly, on a class of *criollo* intellectuals that was already experiencing the revocation of whatever political power they had managed to accrue.

[153] Linnaeus published the complete second edition of *Systema Naturae* (1735) or *System of nature through the three kingdoms of nature, according to classes, orders, genera and species, with characters, differences, synonyms, places* in 1758.

This debate took place in the printed pages of the *Gaceta de literatura* from 1788 to 1790.[154] In one of the first pieces, dated February 15, 1788, Alzate made his position explicit: "May the memory of the famous Linnaeus forgive me if I say that his deep knowledge has done more harm to the true knowledge about plants. . . . What is the purpose of establishing a new language if we are unable to derive any knowledge relative to the virtue of plants, which is what truly matters?" (qtd. in Moreno 3). According to Alzate, the Linnaean system would displace the practical colloquial language of the population of Mexico City. Alzate gave the humorous example of asking a vegetable vendor for "*Phisalis angulata*" (green tomatoes) (qtd. in Moreno 25). Through this example, he conveyed that the conventional knowledge and practices in the New Spanish capital made it illogical and irrational to apply different terminology to already established names. Alzate implied that botany was and should be a shared and accessible discipline.

As Alzate communicated through his *Gacetas*, and Monardes and Benavides had exemplified some two hundred years prior, knowledge of natural products transcended those elements themselves; the contemplation and application of that knowledge could influence all aspects of sociopolitical life. Crucial to Alzate was the connection between a plant's name and the local patrimony, a relationship that the Nahua population had prioritized and the capital of New Spain had embraced. Instead of Linnaean binomial nomenclature, Alzate promoted Nahuatl, the indigenous language of central Mexico, as a legitimate scientific language, and claimed that the ancient Mexicans "used etymological voices to convey a situation or a circumstance" (qtd. in Moreno 25). He deliberately borrowed this last observation from Francisco Hernández at a

[154] My analysis in this section has benefitted enormously from the compilation of *Gaceta* entries on Linnaean classification and the *Castilla elástica* or rubber tree in Roberto Moreno's *Linneo en México: Las controversias sobre el sistema binario sexual, 1788-1798.*

moment when the Crown was attempting to usurp the protomedic's authority. In *Antigüedades de la Nueva España*, Hernández had observed:

> It is remarkable that among people so uncultured and barbarous, seldom is there a word that is arbitrarily attached to its meaning or lacking *ethimo* [ethimology], but nearly all have been adapted to each thing with such accuracy and prudence that simply hearing the name they tend to arrive at its nature. (147)[155]

Drawing on Hernández's study, Alzate argued that giving credit to indigenous knowledge and practical naming practices, rather than importing Linnaean binomial nomenclature, would truly perfect the naming and understanding of botanical elements.

A few years later, in 1792, Cervantes wrote his own *Ensayo a la materia vegetal de Mexico*. The Spanish botanist did not portray himself as opposed to indigenous knowledge, Francisco Hernández, or Alzate. Although he was motivated to maximize the commercial benefit of natural products, Cervantes still relied on indigenous knowledge, Hernandez's research, and Alzate's discussions and written studies, in other words, on the very materials that he sought to question. In the *Ensayo*, Cervantes briefly introduced and described several plants, noting their uses and the processes or sources he used to validate them. Plants were classified by the Linnaean system, but once classified, Cervantes listed some by their Nahuatl name.

Cervantes explained his task, which required that he make "more certain judgment of the plants that are discovered and are considered remedies . . . to make [with them] experiments, without such sense [these plants] will be harmful and dangerous" (vi). He then quoted a Lorenzo de Capua, who had stated:

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[155] Jesús Bustamante has noted that Hernández believed that Nahuatl, with its etymological connections between word and circumstances, was a language that nature could have founded, and thereby the logical choice for naming and classifying its botanical and animal components ("Francisco Hernández," 264-67).

> The doctor does not know what he prescribes, the botanist ignores what he offers, and the rustic herbalist, that barely knows how to read, gathers the plants that his whim dictates. By these fortunes, prescribed medicines rarely bring health, but quite the contrary, bringing death, the end of ignorance for all. (Cervantes, *Ensayo* vii)

Still, his entries on indigenous species contradict the theory that these remedies had ever caused any arbitrary or irreparable harm. Rather than correcting mistaken information, Cervantes verified knowledge that was already established, and revised the process by which the Habsburg monarchy had authorized it in the first place. Cervantes made sixteenth-century data transferable and comprehensible to a European scientific sphere, and brought more reason and order to the uses of natural products.

Aside from Linnaean classification, Cervantes's work did not differ greatly from his sixteenth-century predecessors. He continued to credit indigenous informants for their knowledge of medicinal plants. When unable to do so, he turned to Hernandez's *Historia* and even Alzate's *Gacetas* to verify and authorize his observations. As mentioned above, Cervantes used Linnaean taxonomy to classify specimens, but he also added the plants' Mexican names (vii). His descriptions of plants relied on his observations, but rather than carrying out experiments or treating his own patients with these remedies, he frequently employed comments such as "indians know" (Cervantes 13) and "the indians use" (Cervantes 30) as support for their efficacy. Indigenous doctors and their experience continued to authorize use of medicinal natural products.[156] In an entry about a rubber naturally expelled by the maguey cactus, Cervantes again credited indigenous sources: "the ancient Mexicans made such use of this precious vegetable,

[156] It appears that Cervantes did perform experiments on plants that were transplanted to Mexico. He carried them out in Viceroy Güémes Pacheco's garden and the university's botanical garden.

that they alone could provide material for a long, curious, and instructive dissertation" (19). Though Cervantes credited Alzate for his thorough research on particular natural products and their useful discussions, it is difficult to determine whether Cervantes softened his approach towards indigenous natural products over his five years in Mexico City. Alzate at least portrayed Cervantes as a harsher critic of indigenous practices, Hernandez's contributions, and Alzate's own scholarship.

In contrast to the *Ensayo*, according to the *Gacetas*, Cervantes minimized Hernández's contributions. Cervantes gave a speech on the *Castilla elástica*, formerly known as *árbol de hule* or rubber tree, at the Botanical Garden of Mexico on June 2, 1794. The same day, Alzate included the speech in the *Gacetas*. Cervantes had stated "though I have no news that at this time the resin of the rubber tree is prescribed . . . for any illness, the celebrated Francisco Hernández however, with his characteristic ingenuity, credits having learned it from the Indians" (qtd. in Moreno 170). Characterizing Hernández as naïve and calling his fieldwork into question, Cervantes laid the groundwork for revising Hernández's *Historia* and revisiting "the current state of the Natural Sciences" (E. Álvarez 60). Moreover, while Cervantes acknowledged that indigenous sources had developed the method for extracting resin from the rubber tree, he did not credit them with understanding its utility: "These are not the only uses in which the ancient Mexicans employed the resin of the rubber tree, but the rest need a such a critique that cannot be subjected to the constraints of this editorial" (qtd. in Moreno 170). Choosing to omit these ancient local practices, Cervantes appears to have silenced indigenous sources, trivializing or

entirely dismissing their knowledge.[157] In the case of the *Castilla elástica* Cervantes considered autochthonous medicinal uses of the tree to be irrelevant to European industrial prospects.

In this same lecture, Cervantes announced that the *árbol de hule* should be renamed *Castilla elástica* in honor of Juan del Castillo, an original member of the 1787 expedition who had died in 1793. Cervantes also officially recommended that indigenous labor be employed in making a new product, rubber tubes. Though such an industry would mean employment for the indigenous poor, Cervantes ultimately sought to satisfy European demand, encourage transatlantic trade, and increase royal profit. He echoed the 1787 expedition mandate when he argued that New Spain's natural resources could increase the economic prosperity of the Spanish kingdom.

Cervantes's lecture prompted a vigorous response, and Alzate published it in the *Gaceta*. José Longinos Martínez (1777-1802), a fellow member of Cervantes's expedition who had since parted ways with Martin Sessé, faulted Cervantes for his failure to credit indigenous uses of the tree.[158] Longinos highlighted the medical virtues of *Castilla elástica* and traced them back to traditional indigenous practices that were still in use. Although he partially supported Cervantes's reconceptualization of the tree in Linnaean terms, Longinos had a different vision of its industrial prospects. Supported with his own botanical observations, he proposed an extensive list of industries that could benefit both local and Spanish enterprise (qtd. in Moreno 186-87).

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[157] Other sixteenth-century accounts of *Castilla elástica* and its uses exist. As mentioned in Chapter 2, Muñoz Camargo's description of Nahua methods for extraction and use of the resin ridiculed Spaniards for their inability to master these processes.

[158] With respect to the falling out between Longinos and Sessé, Harold Rickett has attributed it to their "irreconcilable personalities," noting that Longinos preferred to work alone, while Sessé, as the leader of the expedition, wanted the research team to work together (46-47). Relations between the two men eventually became so strained that Longinos refused to communicate with Sessé in person, writing him in 1795: "I have decided not to answer you on any matter except in writing, not only to avoid worse results, but to carry on my work in tranquility of soul" (qtd. in Rickett 50).

Seeking to achieve a reciprocal commercial understanding, Longinos argued that medicines, ink for the printing press, rubber supports for coaches or *sopandas,* and boat-bottom coatings or *carenas* could instead be produced locally (qtd. in Moreno 186-87). Longinos also specified the "departments" of San Blas would benefit from the industry because the trees were found near their communities (qtd. in Moreno 186-87). Colonial authorities would eliminate the expense of transatlantic travel; nonetheless, it was precisely this type of manufacture, one that could increase self-reliance in New Spain that, the Crown sought to prevent at all costs.

By publishing these debates, Alzate brought scientific and potentially hermetic debates to a general audience. Presenting points of friction between the practices of New Spain and the monarchy, he gave the local public and especially the *criollo* intellectual sphere an outlet for cultivating and disseminating ideas that would challenge reform. Eventually this form of resistance would become the ideological basis for the emancipation of the Mexican colony.[159]

Cervantes criticized Alzate for encouraging "imprudent skepticism" (qtd. in Moreno 103) among the "ignorant masses" (qtd. in Moreno 14), even though these ignorant masses also included royal dignitaries such as Cervantes himself and the director of the botanical expedition. Alzate provided Sessé and other authorities with information that was useful to the Crown as it developed and implemented reforms. Sessé spoke of a resin, "made from a plant, which according to what the *Gazeta Literaria del Reino* has informed, breeds atop the roots of a tree named *quapinole*" (E. Álvarez 78). Likewise, the *Gacetas* in 1795 reprinted studies commissioned by the Spanish monarchy, such as Alzate's report on the cochineal insect, "Memoria en que se trata del insecto grana o cochinilla su naturaleza y serie de su vida" (1777).

[159] For an analysis of Alzate's role in providing an ideological basis for Mexican emancipation, see Cruz Soto. For a study of Alzate's use of reason as a tool to promote political freedom in Mexico, see Alberto Saladino García. For a recent compilation of Alzate's works that may relate to a contemporary Mexico, see Alzate and Miruna Achim.

Like Longinos, Alzate expressed anxiety about the political ramifications of natural industries on local society. His "Memoria" on the cochineal insect made seemingly contradictory observations about the politics of the cochineal industry, praising its lucrative and beneficial product but also warning against expansion of the industry into other regions. Alzate feared the resulting surplus would cause market prices to decline and encourage specialized manufacturers to abandon the product:

> Should the time come in which another simple could act as substitute for the [cochineal] grain, the poor unfortunate people of the bishopric of Oaxaca would lose their livelihood over the lack of a commerce that is nearly unique in those provinces. The individual that discovers the means to create gold or silver at low cost would be the most damaging, he would disrupt the order of things, and commerce would be reduced to the most difficult chaos to ever develop. (*Gaceta* 302; vol. 3)

Rather than simply promoting Alzate's own view, the *Gaceta* entries on cochineal highlighted the complexity of the industry and emphasized the uncertainty around the effects of regulation on indigenous skilled labor. Alzate consistently advocated a course of action that would benefit local society and, by extension, the colony as a whole.

The Crown likely drafted Article 61 of the *Real ordenanza* of 1786 after Alzate submitted the "Memoria." The legislation, which echoed Alzate's concerns, directed *intendentes* or the regional authorities that had replaced *alcaldes mayores,* to promote and expand cochineal production within their respective districts while also strictly confining it to the province of Oaxaca. This shift in production strategies was intended to benefit indigenous cochineal

producers, who were authorized to trade their product within Mexico or with Spain (*Real ordenanza* 70). [160]

Alzate concluded the final *Gaceta* with the following statement:

> How useful are the writings of those who take the time to write about what they experience at the time in which they write! Some outsiders [*indirectos*] think that the news the *Gacetas* provide is momentary, that they die in their day; that is not the case, they revive at given time, and are the true archive that those who attempt the history of a country turn to. (Alzate, *Gaceta* 470-71; vol. 3)

In this "true archive," Alzate and his contributors made scientific knowledge into accessible information. He created a record of scientific and political episodes that challenged the imposition of universal policies, a style that closely followed the models established in sixteenth-century narratives about natural products.

Like his predecessors, Alzate portrayed a society's political engagement with nature as a process that responded to and at times contradicted the prevailing ideological currents. Overall, however, he promoted engaging with natural resources in a way that would serve indigenous populations and settlers to New Spain, rather than their colonizing power. Instead of applying abstract concepts, he looked at the particular processes surrounding each autochthonous product in trying to understand that product, its producers, and its consumers. He then publicized the ensuing disputes and negotiations, which became critical forces in the sociopolitics of New Spain.

Political Reciprocity: The Nahua, the Monarchy, and *Criollo* Intellectuals

[160] Florescano has mentioned that it was only in the cochineal industry that the *alcaldes mayores* were allowed this administrative and commercial freedom, and there only because they were the ones that were able to provide the skilled indigenous breeders that the industry relied on (517).

Güémes Pacheco's description of the principle of interdependence between the monarchy and the colony of New Spain with which I began this conclusion echoes the ancient Nahua belief that reciprocal engagement between a ruling *altepetl* and its subjected populations was critical to social welfare. Similar principles were at work as Nahua and Spanish authorities negotiated the insertion of autochthonous natural products, practices, and skilled labor into the gestating colonial societies of central Mexico.

As I have shown throughout my dissertation, Nahua contributions went beyond influencing colonial agriculture and craftsmanship to also impact the formulation of policies with concrete effects on colonial societies. This study has analyzed how Nahua traditions around natural products and indigenous responses to natural and human exploitation modified the colonial agenda. I have explained the role of natural products as points of engagement between European and indigenous participants. This project recognizes natural industries as conduits for natural and social exploitation, but identifies the silk, cochineal dye, and timber industries as sites where indigenous agency safeguarded natural products, laborers, and patrimonial territories during the sixteenth century in central Mexico. Nahua participants were critical agents in perpetuating royal dependence on native natural products, knowledge, and skilled labor. This state persisted until the eighteenth century when Bourbon reforms eliminated any semblance of political autonomy for both indigenous populations and the *criollo* intellectual elite.

Treatises on the practical arts and botanical and scientific writings communicated information about natural products as well as social processes, and portrayed indigenous populations as agents in the formulation of policies that impacted their welfare. Writers and other informants depicted a process of colonization in which the Nahua, through their engagement

with nature, acted as essential functional components of a whole, rather than counterparts or "negative forces constructed as enemies of goodness" (Burkhart 37).

Colonial narratives about nature became spaces of reconciliation in which writers, rather than deny the existence and importance of a second element, consistently fought to incorporate that element.[161] At the same time that the policies and practices of colonial administration led to the exploitation of natural products and indigenous populations, indigenous agents used their knowledge of the cultivation and production of natural resources and their understanding of the sociopolitical frameworks that supported natural industries to find ways to resist depopulation and exploitation. The dynamic that resulted recalls Güémes Pacheco's suggestion that the process of colonization relied on the constant calibration of "mutual interests." By analyzing indigenous strategies to conserve and regenerate natural resources and preserve autochthonous practices, we can come to understand the colonial period not as a moment of passive acceptance of political subjection by the Nahua, but rather as a time when the Nahua sought to devise and contribute to social reforms that would ensure their own conservation and regeneration.

The monarchy's dependence on local industries, through which the colony and the colonial power maintained a semblance of symbiosis, deteriorated in the eighteenth century. As that balance evaporated, it was replaced by the belief that New Spain could become its own sovereign. There is still, however, more work to be done to analyze whether expressions of industry based on particular native products and autochthonous labor also gave indigenous

[161] Louise Burkhart has proposed an interpretation of Nahua cosmic vision in which "for Nahuas the basic cosmic conflict was between order and chaos, for Christians between god and evil . . . only in Christianity was it conceived a struggle between moral absolutes. . . . Christianity tended to assert unity by denying rather than incorporating the second element" (35, 37). Authors who wrote about nature during the colonial period often sought to be inclusive, conveying a vision in which that second element was an "essential, functional component[] of the cosmos" (Burkhart 37).

communities the political leverage to achieve their welfare in that next chapter of interactions between New Spain and Spain.

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